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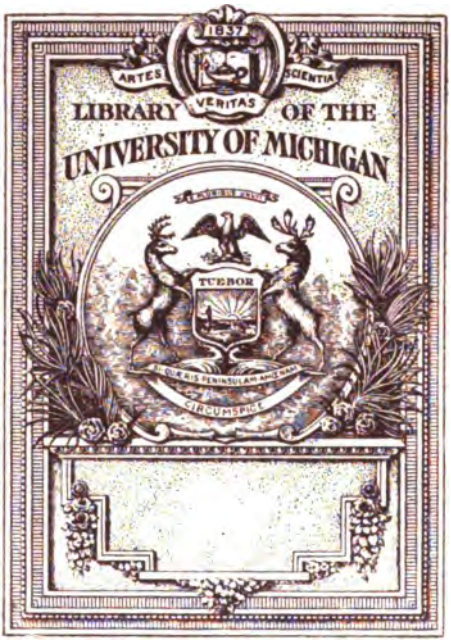

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TRANSACTIONS AND PROCEEDINGS

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REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA

(INCORPORATED).

VOL. XXVII.

[WITH TWO PLATES.]

EDITED BY WALTER HOWCHIN, F.G.S.

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DECEMBER, 1903.

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ROYAL SOCIETY of SOUTH AUSTRAL

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7-9-1920

New Australian Lepidoptera, with Synonomic and other Notes.

By A. Jefferis Turner, M.D., F.E.S.

[Read May 5, 1903]

Fam. NOCTUIDÆ.

Sub-fam. Agaristinæ.

Though a very natural group, this cannot, I believe, be separated from the *Noctuidæ* by any single structural character, and it is therefore, I consider, best treated as a sub-family. Sir Geo. Hampson restricts the *Agaristidæ* to those genera having antennæ more or less dilated before apex, but I do not think this is a natural line of division.

Cruria synopla, *n. sp.*

(*Sunoplos*, allied).

Male and female, 46-54 mm. Differs from *Cruria donovani*, Bdv., as follows:—Wings with markings of a deeper shade of ochreous; spots on forewings smaller, basal and subapical spots nearly obsolete; spots beneath end of cell, and to a less extent than in cell, obscured by dark-fuscous irroration; basal subcostal streak reduced to a thin row of scales; a well-marked narrow streak from base of dorsum parallel to basal half of lower edge of cell; cilia with white bars less marked and obsolete in apical half of termen of forewing. A fine ochreous line across thorax connects the dorsal streaks of the forewings.

This species has been confused with *C. donovani*, and I can understand naturalists who are not acquainted with both forms in their natural state doubting their distinctness. Both forms are constant in their markings, and the median basal streak of forewings of the present species distinguishes it at once. Boisduval's description of *C. donovani* would apply to either species, but Herrich-Schaeffer's accurate figure is certainly *donovani*, as is also Butler's figure (Ill. Het., B.M., I., Pl. iv., f. 7), but Hampson's woodcut of *donovani* (Cat. Lep Phal., III., p. 546) is taken from an example of *synopla*.

Both species occur on the coast of Southern Queensland, *synopla* being especially abundant. *Donovani* is abundant on the Darling Downs, but I have not observed the former there.

Mr. Illidge informs me that the larvæ of *synopla* feed on *Colocasia*.

Type in coll. Turner.

Queensland, Nambour, Brisbane, Mt. Tambourine.

N.S. Wales, Ballina (Richmond River); from November to March.

Gen. IDALIMA, nov.

(*Eidalimos*, comely.)

Head with an anterior rounded protuberance. Palpi moderate, obliquely ascending; second joint densely hairy beneath; terminal joint short, naked, obtuse. Antennæ in male simple, shortly and evenly ciliated. Thorax and abdomen not crested. Middle and posterior tibiæ not hairy on upper surface. Forewings with vein 2 from posterior fifth of cell; 7, 8, 9 stalked, 10 from areole. Hindwings with 3 and 4 closely approximated at base, 5 from middle of cell, 6 and 7 connate.

Distinguished from *Apina*, Wlk., by the rounded frontal protuberance, the simple non-serrated male antennæ, and the smooth mid and posterior tibiæ.

Type *Agarista affinis*, Bdv. I also refer *maculosa*, Roths., to this genus.

Gen. COENOTOCA, nov.

(*Koinotokos*, of common descent.)

Head with a strong conical obtusely-pointed frontal process. Palpi moderate, porrect or slightly ascending; second joint clothed with dense hairs beneath; terminal joint short, naked, obtuse. Antennæ in male serrate, shortly and evenly ciliated. Thorax clothed with very long hairs above. Abdomen with dorsal crests on proximal segments, that on first segment rather large. Mid and posterior tibiæ hairy on upper surface. Forewings with vein 2 from terminal fifth of cell, 7, 8, 9 stalked, 10 from areole. Hindwings with 3 and 4 closely approximated at base, 5 from middle of cell, 6 and 7 connate.

Differs from the preceding in the differently-shaped frontal process, serrated antennæ of the male, and in the presence of abdominal crests.

COENOTOCA MONOPHYES, *n. sp.*

(*Monophues*, simple.)

Male, 30-32 mm. Head blackish, lower edge of face and a pair of spots behind antennæ whitish. Palpi blackish, second joint beneath whitish at base and apex. Antennæ blackish. Thorax dark-fuscous. Abdomen dark-fuscous; apices of segments bright-ochreous, more broadly so on sides, white beneath. Legs dark-fuscous, annulated with white. Forewings triangular, costa nearly straight, apex round-pointed, termen rounded, moderately

oblique; dark-fuscous; a conspicuous white fascia from three-fifths costa to tornus, slightly dilated in disc, and contracted at tornus; cilia dark-fuscous. Hindwings with termen rounded; blackish; cilia blackish. Under surface like upper surface, but forewings with white spots at base and end of cell, and hindwings with a discal and tornal white spot, and some white irroration near base.

Type in coll. Turner.

N.S. Wales, Ballina (Richmond River); two specimens received from Mr. G. A. Waterhouse.

Sub-fam. CARADRININÆ.

Section AGROTINÆ.

CANTHYLIDIA EODORA.

Heliothis eodora, Meyr., Tr. E.S, 1902, p. 26.
Canthylidia tenuistria, Turn., P.L.S., N.S.W., 1902, p. 79.
Queensland, Brisbane. N.S. Wales, Sydney (?).

HELIOTHIS PUNCTIFERA.

Heliothis punctifera, Wlk., Brit. Mus. Cat., XI., p. 691.
Heliothis leucatma, Meyr., Tr. E.S., 1897, p. 368.
North Queensland, Ravenswood. Queensland, Brisbane, Dalby. Victoria, Melbourne. N.S. Wales, Broken Hill.

BUCIARA BIPARTITA.

Buciara bipartita, Wlk., Char. Undess. Lep., p. 36 (*teste* Hampson).
Actinotia acmophora, Meyr., Tr. E.S., 1897, p. 370.
Victoria, Melbourne.

Section MAMESTRINÆ.

MAMESTRA XANTHOCOSMA, *n. sp.*

(*Xanthocosmos*, ornamented with yellow.)

Male, 27 mm. Head, thorax, palpi, and antennæ brownish-fuscous. Abdomen grey-whitish. Legs brownish-fuscous. Forewings elongate-triangular; brownish-fuscous; basal, antemedian, and postmedian transverse lines paler, partly outlined with dark-fuscous; a broad median ochreous-yellow streak between basal and antemedian lines, followed by a small dark-fuscous suffusion; a dark-fuscous suffusion on dorsum beneath streak; orbicular obsolete; reniform ochreous-yellow in upper two-thirds, slenderly outlined with dark-fuscous; a broad ochreous-yellow streak above dorsum from postmedian line halfway to termen; an obscure dentate pale subterminal line; cilia brownish-fuscous. Hindwings

with termen sinuate beneath apex; whitish, towards costa, apex, and termen suffused with grey; cilia grey, with a whitish basal line, on tornus and inner margin whitish.

Type in coll. Agricultural Department, Queensland.

Queensland (?); one specimen without locality.

Leucania acontosema, *n. sp.*

(*Akontosemos*, marked with a dart—in allusion to the basal streak.)

Male, 40 mm. Head, thorax, palpi, and antennæ grey-whitish. Abdomen whitish. Legs pale-grey, mixed with whitish. Forewings elongate-triangular, grey-whitish, a blackish median streak from base to one-fourth, a blackish dot on costa at one-eighth, a second at one-fourth, and a third at five-eighths; antemedian line dark-fuscous, dentate, partly obscured, from second costal dot to dorsum at one-third; orbicular and reniform pale, surrounded by a fuscous suffusion; postmedian line dark-fuscous, interrupted, from third costal dot, at first strongly outwardly-curved, then slightly inwardly curved to dorsum at two-thirds; an interrupted dark-fuscous terminal line, forming a series of wedge-shaped dots; cilia whitish, with a broad median fuscous line. Hindwings with termen sinuate beneath apex; whitish, towards termen suffused with grey; cilia white.

Type in Queensland Museum.

Queensland, Rockhampton; one specimen.

Section Caradrininæ.

Caradrina reclusa.

Prodenia reclusa, Wlk., J. Linn. S., VI., p. 185 (1862).
Caradrina heliarcha, Meyr., Tr. E.S., 1897, p. 370.
North Queensland, Townsville. Queensland, Brisbane.

Caradrina acallis, *n. sp.*

(*Akallis*, without beauty.)

Male and female, 27 mm. Head, thorax, and palpi ochreous-whitish, irrorated with fuscous. Antennæ fuscous. Abdomen pale-grey. Legs grey. Forewings elongate-triangular; whitish, suffused with fuscous—the suffusion is darker in median part of disc from base to termen; basal and antemedian lines obsolete; orbicular and reniform represented by well-marked blackish spots, with an intervening pale spot; postmedian line slender, dark-fuscous from two-thirds costa to two-thirds dorsum, slightly waved; a blackish median longitudinal streak beyond this; cilia pale-fuscous. Hindwings with termen rounded, whitish; cilia whitish.

Type female in coll. Turner. There is a male in the Queensland Museum.

Queensland, Brisbane, in April; two specimens.

CARADRINA POLIOCROSSA, *n. sp.*

(*Polios*, grey; *krossos*, a border—grey-margined).

Male, 28 mm. Head brownish. Palpi whitish; external surface, except towards apex, dark-fuscous. Antennæ fuscous. Thorax grey, slightly purplish-tinged; collar dark-fuscous. Abdomen grey. Forewings elongate-triangular; purplish-grey, partly suffused with chestnut-brown; the brown suffusion is best marked in posterior part of disc, where it is sharply defined in a slightly wavy line from shortly before apex to shortly before tornus, leaving a grey terminal band; antemedian and postmedian lines double, fuscous, dentate towards dorsum; orbicular and reniform faintly indicated, the latter containing a few white scales; a fine interrupted dark-fuscous terminal line; cilia brownish-fuscous, with an interrupted grey-whitish median line. Hindwings with termen slightly sinuate; grey; cilia whitish, mixed with grey.

Type in the Queensland Museum.

West Australia, Albany; one specimen.

DIPHTHERA BERYLLODES, *n. sp.*

(*Beryllodes*, like a green jewel.)

Male, 38 mm. Head bluish-green. Palpi ochreous-whitish; external surface mixed with dark-fuscous. Antennæ fuscous. Thorax bluish-green; anterior surface of anterior crest brownish-fuscous; a few dark-fuscous scales in posterior crests and apices of patagiæ. Abdomen whitish-ochreous, segments slenderly outlined with fuscous; first dorsal crest bluish-green, the others dark-fuscous. Legs dark-fuscous, annulated with ochreous-whitish; upper half of external surface of anterior and middle tibiæ bluish-green. Forewings triangular, clear bluish-green, a dark-fuscous median dot near base, connected with a second dot, which lies between it and a semilunar spot on costa at one-sixth —the last is preceded and followed by a minute costal dot, and the disc between spots is suffused with white; orbicular represented by a white spot, and reniform by a white spot with black centre; a black spot on mid-costa, from which a suffused blackish line proceeds to mid-dorsum; an irregular fuscous subterminal fascia, constricted in middle, edged anteriorly first with black, then with white—this fascia gives off above middle a projection to termen; a series of blackish terminal dots; cilia bluish-green, barred with dark-fuscous. Hindwings with termen rounded;

whitish ochreous; a large median spot and a broad terminal band dark-fuscous; cilia as forewings.

Type in coll. Relton.

Queensland, Dulong (Blackall Range); one specimen taken by Mr. R. H. Relton.

MOLVENA GUTTALIS.

Molvena guttalis, Wlk., Brit. Mus. Cat., XXXIV., p. 1,267.
Beyophila militata, Luc., P.R.S.Q., 1898, p. 71.

North Queensland, Townsville. Queensland, Brisbane, Killarney.

Sub-fam. PLUSIANÆ.

Section SARROTHRIPINÆ.

Gen. AMALOPTILA, nov.

(*Amaloptilos*, with feeble wings.)

Head with appressed scales, a triangular tuft of anteriorly projecting scales on face. Tongue well developed. Palpi stout, loosely scaled, obliquely ascending, not reaching above middle of face; second joint rather long, terminal joint short, stout, truncate. Antennæ in male somewhat serrate, with short ciliations(1). Thorax and abdomen not crested. Forewings elongate, obovate; retinaculum of male bar-shaped; vein 2 from two-thirds, 3 from angle, 4 and 5 approximated at base from well above angle, 6 from near upper angle, 7, 8, 9 stalked, 10 free, 11 free, no areole. Hindwings with 3 and 4 stalked, 5 closely approximated at origin to 3 + 4, 6 and 7 separate, 8 anastomosing with cell to middle.

AMALOPTILA TRIORBIS, *n. sp.*

(*Triorbis*, bearing three circles.)

Male, 34 mm. Head, thorax, palpi, and antennæ whitish-grey, with a few fuscous scales. Abdomen whitish. Legs, anterior pair whitish-grey, mixed with fuscous—middle and posterior pairs broken. Forewings elongate, obovate, costa strongly arched, apex rounded, termen obliquely rounded; whitish-grey, with scattered fuscous scales and markings; a short longitudinal streak from base beneath costa; a line from one-sixth costa obliquely outwards to fold, thence inwardly curved to one-sixth dorsum; orbicular and reniform finely outlined; a third circle in disc beneath and midway between these; a postmedian line from costa at two-thirds, with an obtuse posterior projection in disc, thence inwardly oblique to dorsum at three-fifths; a rather suffused subterminal line, indented above and below middle; suffused longitudinal terminal streaks between veins; cilia whitish-grey. Hindwings with termen slightly sinuate beneath

apex, white, a grey terminal suffusion from apex not reaching tornus; cilia grey, towards tornus and on inner margin white.

Type in coll. Lyell.

N.S. Wales, Newcastle; one specimen.

SARROTHRIPA POLYCYMA.

(*Polukumos*, with many waves.)

Sarrothripa polycyma, Turn,, Tr. R.S., S A., 1899, p. 17.

Sarrothripus crystallites, Meyr., Tr. E.S., 1902, p. 48.

Type in coll. Turner.

Queensland, Brisbane.

HYPOTHRIPA POLIA.

Hypothripa polia, Hmps., J, Bombay N.H.S., XI., p. 452 (1897).

Hypothripa vallata, Meyr., Tr. E.S., 1902, p. 47.

North Queensland, Townsville. Queensland, Brisbane.

Section ACONTIANÆ.

CYMATOPHOROPSIS CATAGRAPHA, *n. sp.*

(*Katagraphos*, embroidered).

Male, 30 mm. Head and thorax fuscous-brown; face brownish-ochreous. Palpi fuscous-brown, inferiorly brownish-ochreous. Antennæ fuscous, in male shortly ciliated (one-half). Abdomen whitish, crests brownish-fuscous, terminal segment fuscous. Legs whitish, anterior pair and tarsi mixed with fuscous. Forewings elongate-triangular, costa slightly arched, apex round-pointed, termen obliquely rounded; retinaculum in male bar-shaped; fuscous-brown, partly mixed with dark-fuscous; markings ochreous-whitish; a broad basal streak, dilated at base, along fold to one-third, giving off two fine oblique streaks beneath, parallel to veins; a minute tuft of black scales rests on upper margin of this streak at one-sixth; a large oval apical blotch from three-fifths costa to apex, containing some brownish scales; a small triangular basal spot with brownish centre on dorsum before tornus; a series of minute ochreous-whitish terminal dots, prolonged in cilia, that above tornus is larger; cilia brownish. Hindwings with termen faintly waved, white, a large apical-fuscous suffusion; cilia whitish.

Referred to this genus provisionally and with some doubt.

Type in coll. Agricultural Department, Queensland.

North Queensland, Cairns; one specimen.

CAREA PLAGIOSCIA, *n. sp.*

(*Plagioskios*, obliquely shaded.)

Male, 40 mm. Head, thorax, and palpi dark-chestnut-brown. Antennæ fuscous, in male very shortly ciliated (one-quarter).

Abdomen fuscous. Legs pale-brownish, anterior pair fuscous; mid and hind femora and tibiæ densely clothed with long hairs; posterior tibiæ in male without spurs, but with a tuft of long hairs from extremity closely approximated to the very long and much dilated first joint of tarsus. Forewings sub-oblong, costa twice sinuate, apex acute, slightly produced, termen obtusely angled on vein 4; brownish, slightly purplish tinged; base of dorsum suffused with chestnut-brown; a straight oblique shade of dark-fuscous and brown scales from mid-costa to tornus; cilia brown. Hindwings with termen rounded, indented above tornus; dark-fuscous; cilia brownish, towards tornus fuscous. Underside of wings reddish brown, forewings suffused with fuscous, except towards costa and apex.

Type in Queensland Museum.

North Queensland, Geraldton (Johnstone River); one specimen.

Section HOMOPTERINÆ.

THYAS AMIDETA, *n. sp.*

(*Ameidetos*, gloomy.)

Female, 68 mm. Head, thorax, palpi, and antennæ grey. Abdomen ochreous; basal segment grey. Legs grey. Forewings triangular, costa nearly straight, apex acute, termen straight, rounded beneath, slightly oblique; grey, with sparsely scattered dark-fuscous scales; markings dark-fuscous; a fine indistinct line from near base of costa to fold; a straight outwardly oblique antemedian line from one-fourth costa to one-third dorsum; a straight inwardly oblique postmedian line from three-fourths costa to two thirds dorsum; orbicular obsolete; reniform represented by a cluster of dark-fuscous dots; an obscure subterminal series of minute dots; cilia grey. Hindwings with termen rounded; fuscous, a suffused paler shade from tornus towards mid-costa, a narrow grey terminal suffusion not reaching to apex or tornus; cilia grey.

Allied to *Ophiusa coronata*, Fab., but hindwings without yellow.

Type in coll. Agricultural Department, Queensland.

North Queensland, Cairns; one specimen.

THYAS REDUNCA.

Ophiusa redunca, Swin., Cat. Oxf. Mus., II., p. 141 (1900).

Thyas aellora, Meyr., Tr. E.S., 1902, p. 29.

Ophiusa trophidota, Turn., P.L.S., N.S.W., 1902, p. 95.

Queensland, Brisbane.

THYAS HICANORA, *n. sp.*

(*Hikanoros*, becoming, seemingly.)

Male, 44 mm. Head, thorax, and palpi fuscous, tinged with ochreous. Antennæ grey. Abdomen dark-grey. Legs dark-grey. Forewings triangular, costa straight, slightly arched towards apex, apex round-pointed, termen rounded, slightly oblique, crenulate; fuscous, tinged with ochreous; a faint, fuscous, slightly sinuate antemedian line from one-fourth costa to one-third dorsum; a fuscous median dot; ground-colour sharply defined by a brownish postmedian line from three-fourths costa, slightly outwardly arched near costa, then straight to before tornus—this line is preceded by a dark-fuscous suffusion; beyond postmedian line disc is whitish-grey, with the exception of a triangular brownish suffusion from line to apex; a terminal series of minute blackish dots between crenulations; cilia fuscous, tinged with ochreous, on tornus whitish-grey. Hindwings with termen rounded, dark-fuscous, towards base paler; a suffused whitish oblique streak from inner margin at two-thirds, towards costa at one-third; a short white terminal line from beneath apex to vein 5; a narrow whitish suffusion from vein 3 to tornus; cilia fuscous, on terminal line white, on tornal suffusion whitish.

Type in coll. Turner.

North Queensland, Townsville, in February; one specimen received from Mr. F. P. Dodd.

Section NOCTUINÆ.

POLYDESMA AURICULATA, *n. sp.*

(*Auriculatus*, eared—in allusion to the complex fovea on forewing.)

Male, 31 mm. Head, thorax, and palpi dark-fuscous, irrorated with ochreous-whitish. Antennæ ochreous-whitish, annulated with black; in male simple. Abdomen fuscous. Legs dark-fuscous, mixed with ochreous-whitish. Forewings triangular, costa slightly arched near base, then straight; apex tolerably pointed, termen bowed, oblique; in male with two deeply excavated thinly-scaled foveas beneath costa towards base—on lower surface these form roundish projections with a deep fovea between, the whole overlapped by the long highly-developed retinaculum, and by a shorter ridge, on which is a short triangular process arising from median vein; dark-fuscous, mixed with ochreous-whitish, the dark scales tending to form transverse fasciæ; postmedian line obscure, dentate, from three-fourths costa to two-thirds dorsum, strongly sigmoid; an interrupted dark-fuscous terminal line; cilia dark-fuscous. Hindwings with termen rounded, slightly crenulate, fuscous; a faint postmedian

line, followed near tornus by a pale line; terminal line and cilia as forewings.

Type in coll. Illidge.

Queensland, Killarney, in November; one specimen.

Corula ischnodes, *n. sp.*

(*Ischnodes*, of meagre appearance.)

Male and female, 25-30 mm. Head and palpi fuscous-grey. Antennæ fuscous; in male with moderate ciliations ($1\frac{1}{2}$) and longer bristles ($2\frac{1}{2}$). Thorax grey. Abdomen fuscous-whitish. Legs grey, posterior pair whitish. Forewings elongate, costa rather strongly arched, apex rounded, termen obliquely rounded; grey, partly suffused with whitish-grey; most veins outlined with dark-fuscous; orbicular obsolete, reniform faintly indicated by a darker shade; antemedian and postmedian lines indicated in whitish-grey; a terminal series of dark-fuscous, very short, longitudinal streaks between veins; cilia grey. Hindwings with termen slightly sinuate; fuscous, towards base suffused with whitish; cilia whitish.

Type in coll. Lyell.

N.S. Wales, Sydney. Victoria, Kewell, Birchip. Six specimens.

Hyperlopha amicta, *n. sp.*

(*Amiktos*, unmixed, without markings.)

Female, 50 mm. Head, thorax, and palpi ochreous-grey, with a few sparsely scattered dark-fuscous scales. Antennæ ochreous-grey. Abdomen ochreous grey. Legs ochreous-grey, with a few sparsely scattered dark-fuscous scales. Forewings triangular, costa slightly arched, apex acute, termen sigmoid beneath apex, not oblique, rounded beneath; pale-ochreous-grey, with a few sparsely scattered dark-fuscous scales; cilia concolorous. Hindwings with termen rounded; fuscous, basal third ochreous-whitish; cilia whitish.

Type in Queensland Museum.

North Queensland (?); one specimen without locality.

Section Erastrianæ

Tarache nivipicta.

Acontia nivipicta, Butl., Tr. E.S., 1886, p. 400.

Tarache clerana, Low, P.L.S., N.S.W., 1901, p. 658.

Tarache hieroglyphica, Low., P.L.S., N.S.W., 1901, p. 658.

I believe these forms are merely varietal; all three are taken commonly on the Queensland coast.

Queensland, Peak Downs, Brisbane, Dalby, Southport. N.S. Wales, Sydney, Broken Hill. N.W. Australia, Roeburne, Derby.

XANTHOPTERA ALBICERIS, *n. sp.*

(*Albiceris*, whitish-yellow.)

Male, 17 mm. Head and palpi ochreous. Antennæ grey, towards base ochreous; in male moderately ciliated (1) with fine slightly longer bristles. Thorax and abdomen pale-ochreous. Legs pale-ochreous; anterior pair grey in front. Forewings triangular, costa slightly arched, apex rounded, termen rounded, slightly oblique; pale-ochreous without markings; cilia concolorous. Hindwings with termen slightly sinuate; pale-ochreous; cilia concolorous.

Type in coll. Turner.

North Queensland, Townsville, in May; one specimen received from Mr. F. P. Dodd. Queensland, Peak Downs; one specimen in British Museum.

XANTHOPTERA CROCODETA, *n. sp.*

(*Krokodetos*, bound with saffron—in allusion to lines on wings.)

Male, 24 mm. Head and palpi purplish-grey. Antennæ grey, in male shortly ciliated (one-half), with longer bristles (1). Thorax purplish-grey, with a pale-ochreous transverse band behind collar. Abdomen purplish-grey. Legs purplish-grey, posterior pair whitish-ochreous Forewings triangular, costa scarcely arched, apex round-pointed, termen bowed, oblique; purplish-grey; a pale-ochreous costal streak, narrowing to a point at apex; lines slender, ochreous, not crossing costal streak; antemedian line straight from beneath one-third costa to one-third dorsum; a transverse linear faintly darker median discal mark, edged posteriorly with ochreous; postmedian line straight from beneath two-thirds costa to three-fourths dorsum; subterminal line wavy to vein 5, thence sharply dentate on veins, and ending on tornus; veins towards termen finely outlined in ochreous; cilia purplish-grey, intersected by continuation of ochreous lines on veins. Hindwings with termen rounded; colour and markings as in forewings, but antemedian line obsolete towards inner margin, and discal mark obsolete.

Type in coll. Turner.

Queensland, Brisbane; one specimen received from Mr. R. Illidge.

SANDAVA XYLISTIS.

Sandava xylistis, Swin., Cat. Oxf. Mus., II., p. 192 (1900).
Meyr., Tr. E.S., 1902, p. 37.
Type in Oxford Museum.

Queensland, Brisbane. Victoria, Melbourne. According to Swinhoe, also from Tasmania.

EUBLEMMA HEMIRHODA.

Micra hemirhoda, Wlk., Brit. Mus. Cat., XXXIII., p. 799.
Thalpochares basilissa, Meyr., Tr. R.S., S.A., 1891, p. 196.
North Queensland, Townsville, in August; one specimen received from Mr. F. P. Dodd.

RIVULA NIPHODESMA.

Rivula nipho leema, Meyr., Tr. R.S., S.A., 1891, p. 197.
Rivula proleuca, Holl., Nov. Zool.
North Queensland, Thursday Island, Cairns, Cardwell.
Also from Bourn.

Gen. ESSONISTIS.

Meyr., Tr. E.S., 1902, p. 36. *Thelxinoa*, Turn., P.L.S., N.S.W., 1902, p. 131, is a synonym.

ESSONISTIS MICRAEOLA.

Essonistis micraeola, Meyr., Tr. E.S., 1902, p. 36.
Thelxinoa calliscia, Turn., P.L.S., N.S.W., 1902, p. 133.
Queensland, Brisbane.

Gen. TRISSERNIS.

Meyr., Tr. E.S., 1902, p. 37. *Bryomima*, Turn., P.L.S, N.S.W., 1902, p. 134, is a synonym.

TRISSERNIS PRASINOSCIA.

Trissernis prasinoscia, Meyr., Tr. E.S., 1902, p. 37.
Bryomima elaeodes, Turn., P.L.S., N.S.W., 1902, p. 134.
Queensland, Brisbane.

Section HYPENINÆ.

I would suggest that the distinction between the *Erastrianæ* and *Hypeninæ* be based on the palpi, all genera with acutely-pointed palpi being placed in the latter group.

PSEUDAGLOSSA SORDESCENS.

Bleptina (?) sordescens, Rosen., A.M.N.H., 1885, p. 424.
Mormoscopa crossodora, Meyr., Tr E.S., 1897, p. 371.
Queensland, Brisbane. N S. Wales, Mount Kosciusko. Victoria, Gisborne.

PANILLA MELANOSTICTA, *n. sp.*

(*Melanostiktos*, black-spotted.)

Female, 21 mm. Head, palpi, thorax, and abdomen dark fuscous, mixed with whitish. Legs whitish, anterior pair fuscous anteriorly. Forewings triangular, costa straight, apex round-pointed, termen crenulate, bowed, somewhat oblique; fuscous-whitish, with scattered dark-fuscous scales and markings: a

suffused basal fascia, followed by a fine dentate transverse line from one-fifth costa to one-third dorsum; an ill-defined median fascia; a finely dentate outwardly curved line from three-fifths costa to two thirds dorsum, succeeded by a whitish line, which again is followed by dark-fuscous blotches on costa and mid-disc; four whitish dots on terminal part of costa; a row of subterminal dots, followed by dark suffusions on apex, mid-termen, and tornus; a fine terminal line; cilia whitish, mixed with fuscous. Hindwings with termen crenulate, rounded; colour and irroration as forewings; a broad suffused dark-fuscous median band; subterminal dots, terminal line, and cilia as forewings.

Type in coll. Turner.

Queensland, Bundaberg, Brisbane; two specimens.

Zethes blechrodes, *n. sp.*

(*Blechrodes*, weak-looking.)

Male, 25 mm. Head and thorax greyish-brown. Palpi very long (5), second joint much elongated (3), terminal joint moderate (1), acute; greyish-brown. Antennæ ochreous-whitish; in male with short pectinations (1), which give rise to tufts of cilia, terminal third simple, ciliated. Abdomen greyish-brown. Legs greyish-brown. Forewings triangular, costa convex at base, moderately excised in middle, apex acute, termen prominently angled on vein 4, above angle slightly excised, beneath crenulate; greyish-brown; a pale brownish-ochreous postmedian line, irrorated with brown scales, and preceded by a whitish discal lunule rather below middle; traces of a fuscous subterminal line; an interrupted dark-fuscous terminal line; cilia pale-brownish-ochreous, mixed with fuscous. Hindwings with termen crenulate, sharply angled on vein 4; greyish-brown; a large whitish tornal blotch partly obscured by ground-colour; terminal line and cilia as forewings.

Sir Geo. Hampson remarks that this species is almost exactly like *Zethes pectinifer*, Hmps., from India, but the male antennæ are quite different.

Type in coll. Agricultural Department, Queensland.

North Queensland, Cairns; one specimen.

Gen. Placerobela, nov.

(*Plakerobelos*, with broad weapons—palpi.)

Head with projecting frontal tuft. Tongue well developed. Palpi obliquely ascending; second joint moderate, not reaching vertex; terminal joint much thickened with scales anteriorly, longer than and as broad as second joint, apex obtusely pointed. (Antennæ in male unknown.) Thorax with a small posterior crest. Abdomen smooth. Forewings with vein 2 from two

thirds, 3 and 4 from angle, 7, 8, 9 stalked, 10 from areole. Hindwings with 3 and 4 connate, 5 arising from midway between 4 and middle of cell, 6 and 7 connate.

The peculiar palpi appear to sufficiently characterise this genus.

PLACEROBELA BRACHYPHYLLA, *n. sp.*

(*Brachuphullos*, short-winged.)

Female, 32 mm. Head, palpi, antennæ, and thorax fuscous. Palpi long (3), second joint as long as breadth of eye, terminal joint long (one and half). Legs fuscous. Forewings triangular, costa nearly straight, apex rectangular, termen rather strongly bowed, slightly oblique; pale-fuscous, finely strigulated with darker fuscous; obscure discal dots at one-fourth, and mid-disc towards costa; a straight line from mid-costa to three-fifths dorsum forms the sharp anterior edge of a paler area which posteriorly is suffused; a series of obscure whitish terminal dots on veins; cilia fuscous. Hindwings with termen strongly bowed; fuscous; cilia fuscous.

Type in coll. Turner.

North Queensland, Townsville, in April; one specimen received from Mr. F. P. Dodd.

HYPENA GYPSOSPILA, *n. sp.*

(*Gupsos*, chalk, and *spilos*, a spot—in allusion to the spot on hindwing.)

Female, 32 mm. Head fuscous, frontal tuft with a few whitish scales. Antennæ fuscous, inferior surface towards base ochreous-whitish (anterior portions broken off). Thorax pale-ochreous-brown. (Abdomen broken.) Legs fuscous. Forewings triangular, costa very slightly arched, apex pointed, termen rather strongly bowed, slightly oblique; pale-ochreous-brown, with a few sparsely scattered blackish scales; a blackish dot beneath costa at one-fourth; a straight brown line from costa at three-fifths to mid-dorsum, edged posteriorly by a fine white line—a small greyish suffusion follows this line on dorsum; a waved subterminal line of minute blackish dots, a brown line close to termen leaving terminal edge paler; cilia fuscous, with a pale median line. Hindwings with termen strongly rounded; dark-fuscous; a large ochreous-whitish blotch at apex; between blotch and tornus there is an ochreous-whitish terminal line, bisected by a conspicuous dark-fuscous line; cilia fuscous, on apical blotch ochreous-whitish.

Type in Queensland Museum.

North Queensland, Cairns, in November; one specimen, taken by Mr. C. J. Wild.

MARAPANA RHODEA, *n. sp.*

(*Rhodeos*, rosy.)

Male, 32 mm. Head and thorax ochreous-whitish, faintly pinkish-tinged, with a few scattered black scales. Palpi rather long (3), porrect, ochreous-whitish, with a few black scales. Antennæ ochreous-whitish; in male simple, with a short bristle (1) on each segment. Abdomen pinkish, with a few blackish scales. Legs ochreous-whitish; bases of outer spurs and a few scattered scales blackish. Forewings elongate-oblong, costa scarcely arched, apex acute, termen sinuate, scarcely oblique; ochreous-whitish, faintly pinkish-tinged, with sparsely scattered blackish scales; a minute blackish dot in mid-disc; a suffused line of dark irroration from apex towards mid-dorsum, followed by a series of minute blackish dots; a series of minute blackish dots between veins close to termen; cilia ochreous-whitish. Hindwings truncate at tornus, termen gently rounded above tornus; ochreous-whitish, suffused with pink; a series of dark-fuscous dots close to termen; a fine interrupted dark-fuscous terminal line; cilia ochreous-whitish.

Type in coll. Turner.

North Queensland, Cairns; one specimen, received from Mr. H. Tryon.

TIPASA DEMONIAS.

Trigonistis demonias, Meyr., Tr. E.S., 1902, p. 39.
Tipasa macrobela, Turn., P.L.S., N.S.W., 1902, p. 126.
Queensland, Brisbane.

TIPASA ASTHENOPA.

Trigonistis asthenopa, Meyr., Tr. E.S., 1902, p. 40.
Prolophota camptoloma, Turn., P.L.S., N.S.W., 1902, p. 127.

I think these are the same. The species is probably variable, but recognisable by the strongly sinuate termen of forewing.

Queensland, Brisbane; N.S. Wales, Gosford.

Section HYBLAEINÆ.

HYBLAEA IBIDIAS.

Hyblaea ibidias, Turn., P.L.S., N.S.W., 1902, p. 155

Recent captures have shown that this species is variable. The forewings may be grey, and both fore and hind wings may be marked with numerous fuscous dots and blotches.

Queensland, Brisbane.

LYMANTRIADÆ.

Gen. HAPLOPSEUSTIS.

Meyr., Tr. E.S., 1902, p. 34.

Acuissa, Turn., Tr. R.S., S.A., 1902, p. 180, is a synonym of

this. I may have been mistaken in referring the genus to this family. Certainly the connection of vein 8 with the cell is nearer the base than in *Euproctis*, and the apparent resemblance in other characters to that genus may be deceptive.

Haplopseustis erythrias.

Haplopseustis erythrias, Meyr., Tr. E.S., 1902, p. 34.
Acnissa pyrrhias, Turn., Tr. R.S., S.A., 1902, p. 180.
North Australia, Port Darwin. North Queensland, Townsville. Queensland, Brisbane.

Euproctis edwardsi.

Teara edwardsi, Newm., Tr. E.S, IV., p. 54 (1856), p. 284, Pl., xviii., f. 10.
Teara togata, Luc., P.L.S., N.S.W., 1891, p. 285.
Queensland, Brisbane. Victoria, Melbourne. South Australia, Adelaide.

Caragola clara.

Redoa clara, Wlk, Brit. Mus. Cat., XXXII., p. 343.
Caviria clara, Hmps., Moths Ind., I., p. 490.
Porthesia collucens, Luc., P.L S., N.S.W., 1889, p. 1090.
Queensland, Brisbane.

Redoa transiens.

Redoa transiens, Wlk., J. Linn. Soc., VI., p. 128.
North Queensland, Armidale, near Townsville, in December; one specimen, received from Mr. F. P. Dodd.

Laelia obsoleta.

Bombyx obsoleta, Fab., Ent. Syst., III., I., p. 463.
Laelia eremaea, Meyr, Tr. R S, S.A., 1891, p. 193.
Queensland, Duaringa, Brisbane.

Orgyia australis.

Female, *Orgyia australis*, Wlk., Brit. Mus. Cat., IV., p. 787.
Lacida postica, Wlk., Brit. Mus. Cat., IV., p. 803.
Orgyia canifascia, Wlk., Brit. Mus. Cat., XXXII, p. 325.
Queensland, Brisbane.

Colussa denticulata.

Teara denticulata, Newm, Tr. E.S., 1856, p. 283.
Darala basigera, Wlk., Brit. Mus. Cat., XXXII., p. 372.
Darala undulata, Feld., Reise Nov., Pl. 98, f. 11.

Colussa connexa.

Darala connexa, Wlk., Brit. Mus. Cat., IV., p. 898.
Darala fervens, Wlk., Brit. Mus. Cat., IV., p. 898.
Darala postica, Wlk., Brit. Mus. Cat., IV., p. 899.
Darala zonata, Feld., Reise Nov., Pl. 99, f. 1.

Heracula leonina, *n. sp.*

(*Leoninus*, like a lion, tawny.)

Male, 58 mm. Head, palpi, and antennæ pale-ochreous. Thorax deep-ochreous, mixed with whitish. Abdomen deep-ochreous, mixed with whitish; base of tuft whitish. Legs whitish-ochreous; tarsi and anterior tibiæ dark-fuscous. Fore-wings elongate-oval, costa slightly arched, more so towards apex, apex rounded, termen very obliquely rounded; ochreous-brown; costal and dorsal edge ochreous; a longitudinal oval whitish spot in mid-disc near base; another rather smaller oval whitish spot at end of cell; veins towards termen outlined in whitish-ochreous; cilia ochreous, mixed with brownish. Hindwings with termen rounded, bright-ochreous; cilia ochreous.

Type in Queensland Museum.

North Queensland (?); one specimen, without locality.

Olene horsfieldi.

Saund., Tr. E.S., 1851, p. 162. Hamps., Moths Ind., I., p. 448 (to which refer for synonymy).

North Queensland, Townsville, in June; one male specimen, bred by Mr. F. P. Dodd. There is a female in the Queensland Museum.

Queensland, Brisbane, in May.

Olene mendosa.

Olene mendosa, Hb., Zutr. Exot. Schm., III., p. 19, Pl. 147, f. 293-4. Feld., Reise Nov., Pl. 99, f. 6.
Antipha basalis, Wlk., Brit. Mus. Cat., IV., p. 806.
Nioda fusiformis, Wlk., Brit. Mus. Cat., V., p. 1,070.
Rilia lanceolata, Wlk., Brit. Mus. Cat., V., p. 1,075.
Dasychira sawanta, Moore, Lep. E.I. Co., p. 340.
Dasychira basalis, Wlk., Brit. Mus. Cat., XXXII., p. 362.
Dasychira divisa, Wlk., Brit. Mus. Cat., XXXII., p. 363.
Dasychira basigera, Wlk., Brit. Mus. Cat., XXXII., p. 363.
Rilia distinguenda, Wlk., Brit. Mus. Cat., XXXII., p. 435.
Rilia basivitta, Wlk., Brit. Mus. Cat., XXXII., p. 436.
Turriga invasa, Wlk., Char. Undescr. Lep. Het., p. 15.
Comment is needless!

North Queensland, Cooktown, Townsville. Queensland, Duaringa, Brisbane.

PSALIS SECURIS.

Psalis securis, Hb., Zutr. Exot. Schm., III., p. 9, Pl. 146, f. 291-2.
Arestha antica, Wlk., Brit. Mus. Cat., IV., p. 805.
Rigema falcata, Wlk., Brit. Mus. Cat., XXXII., p. 437.
Rigema tacta, Wlk., Brit. Mus. Cat., XXXII., p. 438.
Anticyra approximata, Wlk., Brit. Mus. Cat., XXXII., p. 440.
Queensland, Brisbane.

Fam. URANIADÆ.

Sub-fam. URANIANÆ.

ACROPTERIS JUSTARIA.

Micronia justaria, Wlk., Brit. Mus. Cat., XXIII., p. 821.
North Australia, Port Darwin. North Queensland, Thursday Island, Cairns, Johnstone River.

ACROPTERIS STRIATARIA, Clerck.

Teste, Hmps., Moths Ind., III., p. 115.
Micronia teriadata, Gn., Lep., X., p. 29.
Anteia canescens, Luc., P.L.S., N.S.W., 1891, p. 300.
North Queensland, Cape York, Townsville. Queensland, Rockhampton.

ACROPTERIS NANULA.

Micronia nanula, Warr., Nov. Zool., 1898, p. 226.
Queensland, Westwood, Killarney; a series in October.

PSEUDOMICRONIA DISCATA.

Micronia discata, Warr., Nov. Zool., 1899, p. 319.
Anteia doddsiana, Luc., P.R.S., Q, 1899, p. 149.
Priority of publication rests, I believe, with Mr. Warren's name.
Queensland, Brisbane, Toowoomba.

Sub-fam. EPIPLEMINÆ

A difficult group; the species are nearly all small, inconspicuous, and rather variable, and the published descriptions very difficult to identify. The generic revision of the sub-family will be no easy task, and it may be noted in passing that vein 11 of forewings may be either free or strongly anastomosing with 12 within the limits of the same species.

EPIPLEMA COERULEOTINCTA, Warr.

North Queensland, Townsville, in April; two specimens, received from Mr. F. P. Dodd.

Epiplema argillodes, *n. sp*

(*Argillodes*, like clay.)

Male and female, 21-28 mm. Head white; face and palpi dark-brown. Antennæ whitish. Thorax grey-whitish; in female brownish-tinged. Abdomen grey-whitish, with a few fuscous scales on penultimate segment; in female brownish-tinged. Legs ochreous-whitish, anterior tibiæ and tarsi pale-grey. Forewings triangular, costa moderately arched, apex forming an obtuse rectangular projection, termen sigmoid beneath projection; grey-whitish, more or less irrorated with dark-fuscous; in female brownish-tinged; markings dark-fuscous; an obscure series of minute dots on costa; sometimes a dot in disc beneath one-third costa, opposite another above two-fifths dorsum, representing antemedian line; a dot beneath two-thirds costa, sometimes followed by a second dot, opposite a larger spot on two-thirds dorsum, representing postmedian line; a well-marked terminal dot just beneath apex, followed by a conspicuous dark line on concave part of termen, sometimes interrupted; cilia whitish, mixed with dark-fuscous. Hindwings with termen angled and slightly projecting on vein 7, slightly excavated beneath projection, rather strongly bowed on vein 4, and slightly projecting at tornus; colour and irroration as forewings; traces of antemedian line near inner margin at one-third; a strongly marked postmedian line from inner-margin at two-thirds not reaching costa, obsolete in female; cilia whitish. Under surface brown-whitish, with a few fuscous scales.

Type in coll. Turner.

Queensland, Gympie, Brisbane; three specimens, received from Mr. F. P. Dodd and Mr. R. Illidge.

Epiplema conflictaria.

Erosia conflictaria, Wlk., Brit. Mus. Cat., XXIII., p. 851. Hmps., Moths Ind., III., p. 129.

North Queensland, Geraldton, Townsville; two specimens, in November and December.

Epiplema oxytypa, *n. sp.*

(*Oxutupos*, with a sharp or pointed mark—in allusion to antemedian line of forewings.)

Female, 20 mm. Head white, face and palpi fuscous. Antennæ whitish. Thorax white, sometimes with a few dark-fuscous scales. Abdomen grey-whitish, sometimes with a few dark-fuscous scales. Legs white, anterior pair dark-fuscous anteriorly Forewings triangular, costa gently arched, apex rounded, termen gently rounded, very slightly indented between veins 4 and 5, slightly oblique; pale-whitish-ochreous; base of costa, mid and

terminal portions of disc more or less suffused with grey; sparsely scattered dark-fuscous scales tending to form minute transverse strigulæ, most numerous on costa; lines ferrugineous-fuscous; antemedian line from costa at one-fourth, very obliquely outwards, acutely angled in mid-disc to end in dorsum at two-fifths; postmedian line from costa beyond middle, strongly outwardly curved and slightly waved, then sigmoid to dorsum at three-fourths; a subterminal series of minute black dots not reaching tornus; cilia whitish, with a ferrugineous central line and dark-fuscous dots opposite veins. Hindwings with termen, forming two acute projections on veins 4 and 7; colour and irroration as forewings; antemedian line fine, transverse, with a slight median angle; postmedian line evenly curved, slightly waved in middle, followed by a whitish line; a spot of fine blackish irroration near mid-termen; a fine whitish terminal line, preceded by a greyish line, and this again by three fine black dots between projections; cilia ferrugineous-fuscous, apices whitish, towards tornus whitish, with a median ferruginous line. Under surface white, with dark-fuscous strigulæ; costal and terminal areas of forewings suffused with grey.

Type in coll. Turner.

Queensland, Brisbane, in May; two specimens, received from Mr. R. Illidge.

Epiplema inclarata.

Erosia inclarata, Wlk., Brit. Mus. Cat., XXXV., p. 1,646.

Thursday Island, in March.

North Queensland, Townsville, in May; received from Mr. F. P. Dodd.

Epiplema xylinopis, *n. sp.*

(*Xulinopis*, looking like wood.)

Female, 22 mm. Head whitish-grey; face and palpi dark-brown. Antennæ ochreous-whitish. Thorax and abdomen pale-brownish, tinged with purplish-grey. Legs ochreous-whitish, anterior pair grey. Forewings triangular, costa gently arched, strongly arched just before apex, apex tolerably acute, termen sinuate beneath apex, bowed on vein 3; pale brownish, suffused, except in mid-disc, with purple-grey; with numerous obscure darker transverse strigulæ; lines obscure, ochreous; antemedian at one-third, obsolete towards margins; postmedian from beneath two-thirds costa to three-fourths dorsum, dentate, not outwardly bowed; a narrow terminal dark-fuscous suffusion from apex to mid-termen; cilia bases pale-brownish, apices dark-fuscous. Hindwings with termen straight to between veins 1 and 2, where it forms an acute angle and is notched between this and tornus;

colour, strigulation, and cilia as forewings. Under surface grey with sparsely scattered dark-fuscous strigulæ.

Peculiar in the shape of the hindwings, and referred to this genus only provisionally.

Type in coll. Turner.

North Queensland, Townsville, in April; one specimen, received from Mr. F. P. Dodd.

Monobolodes subfalcata.

Monobolodes subfalcata, Warr., Nov. Zool, 1898, p. 230.

North Queensland, Townsville, in March and April; six specimens, received from Mr. F. P. Dodd. Queensland, Duaringa.

Dirades platyphylla, *n. sp.*

(*Platuphullos*, with broad wings.)

Male and female, 25-26 mm. Head white; face and palpi dark-fuscous. Antennæ white. Thorax and abdomen whitish or pale-grey. Legs whitish, anterior pair fuscous. Forewings triangular, costa slightly arched, apex rounded, termen obliquely rounded; whitish or pale-grey; a darker suffused line along basal half of costa; a few scattered black scales; antemedian line obsolete; a small or minute blackish discal dot; postmedian line slender, faintly marked, ferrugineous, externally margined with whitish, in female fuscous, from three-fourths costa first strongly outwardly, and then strongly inwardly curved to three-fourths dorsum, dorsal end blackish in male, in female preceded on dorsum by a broad fuscous suffusion; a subterminal row of black dots from apex to mid-termen; cilia grey. Hindwings with termen in male angled and slightly projecting on vein 7, thence nearly straight to vein 4, inner portion of wing folded over and containing a glandular thickening; termen in female with small acute projections on veins 4 and 7; colour irroration and cilia as forewings; postmedian line in male very slender, evenly rounded, crenulate; in female rather strongly bowed and angled between veins 3 and 4, and better marked; a dark-fuscous discal streak precedes it in female; in male three black subterminal dots.

Type in coll. Turner.

North Queensland, Thursday Island. Queensland, Brisbane, in February and March; seven specimens.

Dirades mutans.

Erosia mutans, Butl., Ann. Mag. N.H, 1887, p. 434.

Dirades leucocera, Hmps., Ill. Het., VIII., p. 102, Pl. 150, f. 13; Moths Ind., III., p. 133.

North Queensland, Thursday Island, Townsville, in March; four specimens, received from Mr. F. P. Dodd.

Dirades leucocephala.

Erosia leucocephala, Wlk., Brit. Mus. Cat., XXVI., p. 1,758.
Epiplema lugens, Warr., Nov. Zool., 1897, p. 202.
North Queensland, Geraldton, Townsville, in March. Queensland, Rockhampton, Brisbane, in August.

Dirades decorata.

Dirades decorata, Warr., Nov. Zool., 1898, p. 228.
North Queensland, Townsville, in February and April Queensland, Duaringa, Brisbane, and Mount Tambourine, in November, December, March, and April.

Dirades stereogramma, *n. sp.*

(*Stereogrammos*, stiffly marked—in allusion to postmedian line of forewing.)

Female, 16 mm. Head white; face and palpi fuscous. Antennæ whitish. Thorax and abdomen white, irrorated with brownish. Legs whitish, irrorated with fuscous; anterior pair mostly fuscous. Forewings triangular, costa nearly straight, slightly arched towards apex, termen straight above, slightly rounded towards tornus, dorsum somewhat incurved; grey-whitish, irrorated with brownish; a few dark-fuscous scales on costa, and near base beneath costa; a brownish median band, anterior margin from one-third costa to two-fifths dorsum, strongly angulated outwards; posterior edge from beyond mid-costa to three fourths dorsum, nearly straight, slightly inwardly curved in mid-disc, edged posteriorly with whitish; three or four subterminal dark-fuscous spots above mid-termen; cilia whitish, mixed with brownish and dark-fuscous. Hindwings with termen rounded, with short acute projections on veins 4 and 7; grey-whitish, with sparse brownish and dark fuscous irroration; posterior line whitish, partly edged anteriorly with brownish, rather strongly outwardly bowed; a dark subterminal line, preceded by a whitish line, and interrupted by two white streaks on either side of inner projection; cilia as forewings.

Type in coll. Turner.

North Queensland, Townsville, in March; one specimen, received from Mr. F. P. Dodd.

Paradirades assimilis.

Paradirades assimilis, Warr., Nov. Zool., 1896, p. 353.
My example has a broad obscurely darker band across middle of both wings.

North Queensland, Cooktown, Townsville, in May; one specimen, received from Mr. F. P. Dodd.

LOBOGETHES INTERRUPTA.

Lobogethes interrupta, Warr., Nov. Zool., 1896, p. 352.
Gathynia despecta, Warr., Nov. Zool., 1898, p. 229.
Erosia radiata, Luc., P.R.S., Q., 1898, p. 17.

North Queensland, Townsville; Queensland, Duaringa, Brisbane, Dalby, Warwick.

EUPTEROTIDÆ.

EPICOMA ARGENTATA.

Teara argentata, Wlk., Brit. Mus. Cat., XXXII., p. 355.
Marane subargentea, Wlk., Brit Mus. Cat., XXXII., p. 397.
Teara argentosa, Luc., P.L.S., N.S.W., 1889, p 1089.
North Australia. North Queensland, Townsville. Queensand, Duaringa.

EPICOMA ASBOLINA.

Epicoma asbolina, Turn., Tr. R.S., S.A., 1902, p. 183.
I have since received the male from Mr. F. P. Dodd. The sexes are similar, and in this it differs from the allied *E. barnardi*, Luc.

North Australia, Port Darwin. North Queensland, Townsville, Bowen.

Gen. HYPERCYDAS, nov.

(*Huperkudas*, glorious.)
Head, palpi, thorax, legs, and abdomen densely hairy. (Antennæ in male unknown.) Forewings with vein 2 from middle of cell, 3 from before angle, 4 from angle, discocellular oblique, 5 from upper angle, 6, 7, 8, 9, 10 stalked, 11 connected by a bar with 9 + 10 beyond 8. Hindwings with veins 3 and 4 separate at base, discocellular oblique, 5, 6, 7 stalked, 8 widely diverging from cell near base.

Allied to *Melanothrix*, Feld. (Hampson, Moths Ind., I., 44), differing in the bar between veins 11 and 9 + 10 of forewing, and stalking of vein 5 of hindwing.

HYPERCYDAS CALLILOMA *n. sp.*

(*Kallilomos*, beautifully margined.)
Female, 70 mm. Head, palpi, thorax, and abdomen clear brownish-ochreous. Antennæ dark-fuscous, near base ochreous-whitish. Legs densely hairy, dark fuscous; femora brownish-ochreous. Forewings triangular, costa nearly straight to two-thirds, thence moderately arched, apex rounded; termen slightly rounded, moderately oblique; clear brownish-ochreous; a whitish discal spot above middle at one-third; a conspicuous whitish subterminal line, sharply dentate between veins; cilia brownish-ochreous. Hindwings with termen rounded; colour and markings as forewings, but without discal spot.

Type in Queensland Museum.

North Queensland (?). One specimen without locality. Sir Geo. Hampson informs me that there is a much browner specimen in the British Museum from New Guinea.

LASIOCAMPIDÆ.

ENTOMETA RUFESCENS.

Gastropacha rufescens, Wlk., Brit. Mus. Cat., VI., p. 1395.
Megasoma rubida, Wlk., Brit. Mus. Cat., XXXII., p. 566.
Bombyx crenulata, Luc., P.L.S., N.S.W., 1893, p. 137.
Queensland, Brisbane. Victoria, Melbourne. Tasmania, Hobart.

CLATHE ANTRACICA.

Clathe anthracica, Turn., Tr. R.S., S.A., 1902, p. 186.
Type in coll. Lyell.
Victoria, Gembrook.
These particulars were accidentally omitted when describing this species.

CLATHE ALBICANS.

Sitina albicans, Swin., Cat. Ox. Mus., I., p. 268, Pl. 6, f. 10 (1892).
Bombyx pinnalis, Luc., Tr. Nat. Hist. Soc , Q., 1895, p. 103.
These are, I think, identical.
Queensland, Brisbane, in April; one specimen. Swinhoe's type is said to be from Western Australia.

LIMACODIDÆ.

NATADA ORDINATA.

Doratifera ordinata, Butl., Tr. E.S., 1886, p. 388.
Doratiphora colligans, Luc., P.R.S., Q., 1901, p. 76.
North Queensland, Townsville. Queensland, Peak Downs, Brisbane.

APODECTA MONODISCA.

Apodecta monodisca, Turn , Tr. R.S., S.A., 1902, p. 189.
Anisobathra actinias, Low., Tr. R.S., S.A., 1902, p. 221.
North Queensland, Thursday Island, Townsville, Mackay. Queensland, Stradbroke Island.

Fam. ZEUZERIDÆ.

XYLEUTES COSCINOTA, *n. sp.*

(*Koskinotos*, sieve-like.)

Male, 68 mm. Head and thorax grey, finely irrorated with whitish; thorax with a dark-grey horseshoe-shaped mark posteriorly, its apex being at mid-thorax. Palpi dark-grey, inferior surface white. Antennæ whitish-grey; pectinations ochreous-fuscous. Abdomen grey, irrorated with whitish; bases of segments whitish. Legs grey, irrorated with whitish. Forewings

elongate, costa scarcely arched, apex rounded, termen gently rounded, strongly oblique; white, crossed by very numerous fine grey strigulæ, which are irregularly connected by cross-bars, forming a fine sieve-like pattern; about a dozen grey dots on costa; an irregular grey discal spot rather beyond middle; a somewhat triangular grey blotch on fold beneath mid-disc; a terminal series of dark-grey dots extending into cilia; cilia white, bases partly grey, on dots wholly grey. Hindwings elongate, termen sinuate; white; along termen is a narrow area of sieve-like grey markings; terminal dots and cilia as forewings.

Type in coll. Turner.

North Queensland, Townsville, in October; one bred specimen, received from Mr. F. P. Dodd.

XYLEUTES ACONTUCHA, *n sp.*

(*Akontouchos*, bearing a dart—in allusion to mark on fold of forewing.)

Male and female, 58-64 mm. Head grey. Palpi white, external surface blackish. Antennæ whitish-grey; pectinations dark-fuscous. Thorax grey, with two diverging blackish lines from centre of collar to posterior angles Abdomen grey. Legs grey; tarsi dark-fuscous, annulated with whitish. Forewings elongate, costa gently arched, apex rounded, termen gently rounded, strongly oblique; pale grey, markings blackish; a dark-fuscous suffusion beneath basal third of costa; half a dozen dots on costa; a broad line on fold from one-eighth to middle, its posterior extremity slightly enlarged, ending in an acute point; a terminal series of dots extending into cilia; cilia whitish, except on dots, with a few grey scales. Hindwings elongate, termen nearly straight; whitish-grey; a few grey scales towards termen; cilia whitish, opposite veins barred with dark-fuscous.

The female is similar to the male, but darker, with markings less distinct.

Type in coll. Turner.

North Queensland, Townsville, in October and November; two bred specimens, received from Mr. F. P. Dodd.

Fam. NOCTUIDÆ.

Sect. HOMOPTERINÆ.

Gen. ACANTHOCOLES, *nov.*

(*Akantha*, a thorn, prickle; *colon*, a limb—with prickly limbs.)

Head smooth. Tongue strongly developed. Palpi ascending, recurved; second joint with loosely spreading scales beneath; third joint long, stout, obtuse, nearly reaching vertex, with appressed scales. Antennæ in male (unknown). Thorax (rubbed). Abdomen smooth. Fore-, mid-, and hind-tibiæ with smooth appressed scales and numerous small spines; mid-tibiæ with one, hind-tibiæ with two pairs of spurs, the inner spurs longer. Fore-

blackish, somewhat bronzy tinged; a large roundish white spot in middle of wing; cilia dark fuscous, chequered with white.

Reminds one of *Cœruleitincta*, Lucas, but is without the anterior spots in both wings.

Mackay, Queensland; one specimen in October.

CRURIA (?) PLACODES, n. sp.

Female, 44 mm. Head, palpi, antennæ, and thorax dark fuscous, head and palpi mixed with orange, thorax with two narrow anterior transverse bands. Abdomen and legs dull yellow, abdomen banded with black. Forewings elongate, triangular, costa gently arched, termen rounded, oblique; blackish; markings pale ochreous-yellowish; a narrow elongate spot in end of cell; a small, somewhat quadrate spot on innermargin at one-third; a large transverse fascia-like spot, from immediately beneath costa at two-thirds to three-fourths across wing, obliquely placed; an irregular spot on anal angle; a quadrate spot at apex; cilia blackish. Hindwings with termen slightly waved; blackish; a large ochreous-yellow rounded basal patch, reaching half-across wing, but not reaching innermargin; basal fifth of wing blackish; a small ochreous spot beneath apex; a large ochreous spot just above anal angle; cilia as in forewings.

Allied to *maculosa*, Roths'. I have refrained from forming a new genus, as probably Rothschild has already done so.

Tasmania, near Hobart; one specimen in March.

CRURIA (?) HEMIPHRAGMA, n. sp.

Male, 40 mm. Head, antennæ, palpi, thorax, and abdomen fuscous; head with some ochreous scales, anal tuft yellow. Legs fuscous, coxæ ochreous, tibiæ and tarsi with some whitish rings. Forewings elongate, triangular, costa gently arched, termen rounded, oblique; fuscous, with whitish markings; a row of four moderate spots just beneath costa, between base and one-third; a similar longitudinal row of spots along vein 1, between base and two-fifths; a small spot in middle of cell; an elongate, somewhat reniform spot in end of cell; a rather broad transverse oblique fascia, from immediately beneath costa at two-thirds to two-thirds across wing, curved around on lower half with a strong excavation on anterior edge; a few scales along termen; cilia fuscous. Hindwings with termen rounded, hardly waved; dark fuscous; a transverse whitish median band, not near reaching either margin; cilia as in forewings.

Allied somewhat to *affinis*, Boisd.

CARADRINIDÆ.

ACRONYCTA PSORALLINA, n. sp.

Male, 36 mm. Head and thorax light mossy-green mixed with white. Palpi whitish, at base blackish, antennæ ochreous, abdomen grey-whitish, crests fuscous. Legs fuscous, tibiæ and tarsi banded with whitish. Forewings elongate, moderate, costa nearly straight, apex obtuse, termen slightly waved, rounded; dull white, mixed with light mossy-green and darker green; costa spotted throughout with greenish-fuscous, spots at one-fourth, middle, and four-fifths larger; from spot in middle proceeds an irregular transverse greenish-fuscous fascia to fold, thence continued to termen above anal angle, interrupted by a sharp white streak before its termination and more or less above fold; a fine black interrupted line running through centre of posterior end of greenish-fuscous streak, and with two teeth on its upper edge; from spot at four-fifths proceeds a fine curved blackish line reaching to nearly half across wing, edged anteriorly by a parallel white streak; a series of greenish lunulate marks along termen; cilia whitish, barred with fuscous at extremities of veins. Hindwings with termen faintly waved; dull whitish; a faint fuscous discal spot; a dull coppery-reddish fascia along termen edged by a darker waved line, both becoming somewhat obsolete at anal angle; cilia as in forewings. Underside of wings very pale greenish-white; forewing strongly suffused with dull coppery-red, except at base and along innermargin.

Reminds one of *Corula lichenopa*, Meyr.

Herberton, Queensland; one specimen.

CARADRINA (?) PUDICA, n. sp.

Male, 20 mm. Head whitish. Thorax silvery-grey, collar broadly whitish. Palpi and antennæ fuscous, ciliations nearly 1. Abdomen greyish ochreous. Legs pearly-white. Forewings elongate, moderate, termen obliquely rounded; silvery grey; veins faintly outlined with fuscous; a fine narrow whitish streak along costa, from base to beyond middle; cilia silvery grey, base darker. Hindwings with termen irregularly waved; iridescent white, infuscated on upper half of termen and apex; cilia white.

Derby, Western Australia; one specimen, in November.

CARADRINA (?) LOPHOTA, n. sp.

Male, 20 mm. Head, thorax, and palpi dark fuscous, palpi whitish beneath. Antennæ fuscous, ciliations one-half (abdomen broken). Legs whitish. Forewings elongate, moderate,

termen gently rounded, oblique; dark fuscous; dorsal third mixed with bluish-white towards termen, especially on upper third; a slightly raised patch of blackish scales on innermargin near base, followed posteriorly by a double fuscous line, indicating first line which is faintly traceable to costa at one-fourth, angulated in middle; second line traceable, but not forming definite markings; subterminal obscure, blackish, dentate; a row of small black lunules along termen, edged posteriorly with fine white points; cilia blackish. Hindwings with termen rounded; pale-ochreous, infuscated along termen; a fuscous line along termen; cilia ochreous.

The raised crest of scales on forewings is a noticeable character. This and previous species will require new genera, but as so many new genera have been recently described, and I do not yet possess the literature, I think it better to leave the matter in abeyance for the present.

Derby, Western Australia; one specimen, in November.

ACONTIADÆ.

Erastria onthodes.

Female, 30 mm. Head, palpi, antennæ, thorax, and abdomen dark fuscous, crest of abdomen fuscous. Legs blackish ringed with whitish. Forewings elongate, triangular, costa hardly arched, termen faintly waved, rounded; dark fuscous, markings darker fuscous, obscure; first line from one-fourth costa to one-fourth innermargin, strongly waved; median and second, waved, hardly traceable; subterminal waved, moderately defined, rather thick; orbicular hardly traceable; reniform well defined, fuscous, edged with whitish; a row of small white dots along termen; cilia fuscous, with blackish spots at extremities of veins. Hindwings with termen faintly waved, rounded; fuscous, becoming lighter on basal half; a short whitish line, edged above and below by its own width of blackish, just above anal angle; a series of blackish lunulate marks along termen, edged above with obscure whitish marks; cilia light fuscous.

Recalls *Euplexia confundens*, Walk., in general appearance.

Duaringa, Queensland; one specimen.

Tarache lunata, n. sp.

Male, 25 mm. Head, palpi, thorax, and abdomen fuscous, mixed with whitish. Antennæ broken. Legs whitish, tibiæ and tarsi ringed with blackish. Forewings elongate, triangular, costa arched at base, thence nearly straight, termen rather strongly bowed; oblique; fuscous, with silvery-whitish

markings, edged with fuscous; an elongate-lunate mark just below costa in middle; a moderately large quadrate spot on innermargin near base reaching more than half across wing, its posterior extremity continued along fold as an elongate spot to middle; an irregularly waved transverse fascia, from four-fifths costa to innermargin just before anal angle, strongly sinuate outwards on upper two-thirds, and more or less widely furcate on lower one-third; cilia fuscous. Hindwings light fuscous; a whitish spot in middle of wing; costa broadly dull whitish; an interrupted whitish line along termen; cilia fuscous.

An exceptionally distinct species.

Lake Mulligan, Central South Australia; one specimen in November.

TARACHE MICRASTIS, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, and abdomen dark fuscous. Legs greyish. Forewings elongate, moderate, costa gently arched, termen oblique, hardly rounded; dark fuscous; first line double, dull ferruginous, waved on lower half; median shade moderately thick, dark fuscous, broadest on upper half; second line, double fine, black, strongly curved outwards on upper two-thirds; orbicular small, whitish, edged blackish; reniform dull whitish, similarly edged; a roundish blackish spot on costa before apex; a fine black line along termen; cilia fuscous, basal half darker, with a median blackish parting line. Hindwings with termen rounded; fuscous, becoming paler on basal half; cilia fuscous, with a darker subbasal line.

Tennant's Creek, Central South Australia; one specimen in November.

TARACHE NEUROTA, n. sp.

Male, 20 mm. Head, palpi, antennæ, thorax, legs, and abdomen ochreous-white. Forewings elongate, triangular, costa gently arched, termen obliquely rounded, ochreous-white, markings reddish ferruginous; a small mark at base; a waved line from costa at one-third to innermargin at one-third, becoming broadly dilated in middle; a second similar line, curved outwards on upper two-thirds, from costa at two-thirds to innermargin at two-thirds; subterminal line rather thick, more or less interrupted throughout by streaks of ground color; a thick line along termen; cilia ochreous. Hindwings light ochreous; a suffused fuscous discal spot; a transverse fuscous post median line; a parallel subterminal similar line, more suffused; cilia ochreous.

Cooktown, Queensland; one specimen.

Churia thermodes, n. sp.

Male and female, 28-30 mm. Head, antennæ, and thorax light reddish-ochreous, palpi whitish-ochreous. Abdomen light ochreous. Legs reddish-ochreous, dusted with whitish. Forewings elongate, triangular, costa hardly arched, termen obliquely rounded, very faintly sinuate beneath apex; light reddish-ochreous, costa lighter ochreous, shortly strigulated with reddish, more perceptible in female; orbicular and reniform dot like, white, hardly traceable in male; cilia reddish-ochreous. Hindwings with termen unevenly waved; light ochreous, becoming finely irrorated with reddish on posterior half; cilia whitish, with a fuscous subbasal line on upper half of termen.

The coloring of the sexes is somewhat different, the male being much more ochreous than the female, which is strongly suffused with reddish, but intermediate forms occur.

Tennant's Creek, Central South Australia; two specimens in November. I have seen others from the same locality.

Zagira xylonota, n. sp.

Male, 20 mm. Head, palpi, antennæ, and thorax reddish, mixed with white. Abdomen greyish, crests reddish. Legs whitish. Forewings elongate, triangular, costa hardly arched, termen somewhat bowed, especially in middle, dull whitish, suffusedly irrorated with light reddish, so as to appear pale reddish throughout; costal edge reddish; all markings obsolete; posterior sixth of wing darker reddish, especially along termen; cilia reddish-ferruginous. Hindwings with termen irregularly and faintly waved; pale whitish-ochreous, faintly reddish tinged along termen; cilia ochreous, tinged with reddish.

Mackay, Queensland; one specimen in November.

Amyna spilonota, n. sp.

Female, 25 mm. Head, palpi, antennæ, and thorax dull greyish. Abdomen greyish-white. Legs greyish. Forewings elongate, triangular, costa slightly arched, termen hardly rounded, oblique; pale greyish-fuscous, markings obscure; first line fuscous, waved, hardly perceptible; median appearing as a short oblique fuscous shade, just reaching anterior edge of reniform spot; second line fuscous from costa just above reniform, thence curved outwards, strongly waved, and terminating on innermargin at two-thirds; costa between line and apex with five or six ochreous-white spots, separated by fuscous

marks; subterminal thick, light fuscous, sinuate outwards above and below middle; orbicular moderate, whitish, blackish edged; reniform whitish edged anteriorly with blackish, posteriorly with fuscous; a series of blackish lunate marks edged with ochreous-white along termen; cilia whitish, fuscous tinged. Hindwings with termen faintly waved; light fuscous, at base lighter; lunate marks as in forewings; cilia as in forewings.

Tennant's Creek, Central South Australia; one specimen in November.

DIERNA ACHROA, n. sp.

Male, 35 mm. Head, palpi, antennæ, thorax, legs, and abdomen light ochreous-fuscous, palpi fuscous on sides, hairs of posterior legs long, greyish. Forewings elongate, triangular, costa nearly straight, termen angulated in middle, slightly sinuate above and below; dull ochreous, fuscous tinged; an outwardly oblique moderately thick fuscous shade from costa before middle to reniform spot; a similar, more indistinct shade from costa at about three-fourths to lower extremity of preceding shade, thus forming an irregular triangle and enclosing reniform, which is obscurely outlined with ferruginous; a moderately thick subterminal fuscous streak, from costa at five-sixths to innermargin before anal angle, becoming divided by a fine line of ground color on lower half, slightly angulated in middle; a row of irregular fuscous dots along termen; cilia dull ochreous. Hindwings with termen angulated in middle; color and dots along termen as in forewings; subterminal streak fuscous, straight, centred throughout with a fine line of ground color, from five-sixths of costa to innermargin before anal angle; cilia as in forewings.

Mackay, Queensland; one specimen in November.

CALLYNA LEUCONOTA, n. sp.

Male, 40 mm. Head, palpi, antennæ, and thorax dark fuscous, posterior two-thirds of thorax much paler. Abdomen fuscous. Legs dull reddish-fuscous. Forewings elongate, moderate, costa hardly arched, termen unevenly rounded; fuscous, markings dark fuscous; a well defined large cuneiform patch near base; its apex directed towards innermargin, but not near reaching it, outer edge with a sharp short angulation below costa and with a strong concavity below; a fine light fuscous line, from costa at about middle to innermargin before two-thirds, strongly angulated above middle; from angulation proceeds a rather thick straight streak to meet subterminal

spots; subterminal streak formed by a series of moderately large triangular spots not reaching innermargin; ground color between first and subterminal lines dark fuscous on upper half of wing; a roundish ochreous-white patch at apex; a faintly defined row of small ochreous spots along termen; cilia dark fuscous, at apex ochreous-white. Hindwings with termen waved; dark bronzy-fuscous; cilia whitish, with a fuscous subbasal line, becoming wholly fuscous at apex.

In the neighborhood of *costiplaga*, Moore.

Mackay and Brisbane, Queensland; one specimen.

Gadirthra hades, n. sp.

Female, 36 mm. Head, palpi, antennæ, and thorax dark fuscous, palpi beneath ochreous. Abdomen greyish-ochreous. Legs greyish-fuscous, tarsi black, ringed with whitish. Forewings elongate, triangular, costa gently arched, termen waved, rounded; dark smoky-fuscous; all markings obscured by general ground color, except subterminal which is strongly dentate and whitish; veins towards termen more or less outlined with blackish; cilia dark smoky-fuscous. Hindwings with termen waved; pale ochreous; a fuscous lunate discal mark; a broad fuscous band along termen occupying posterior half of wing; indications of an ochreous line along termen; cilia ochreous, mixed with fuscous on middle of termen and at extremities of veins.

The specimen not being in the best of condition, the description will probably need amplifying.

Mackay, Queensland; one specimen in November.

Ischyja polystigma, n. sp.

Female, 54 mm. Head, palpi, thorax, and abdomen dark fuscous, sparsely irrorated with whitish and with a bluish metallic tinge. Legs greyish-ochreous. Forewings elongate, triangular, costa moderately arched, termen gently rounded, slightly waved; dark fuscous, tinged with bluish metallic reflections, and sparsely irrorated with bluish white scales; lines obscure, dark fuscous; first nearly straight, anteriorly edged with three moderate ochreous-white spots, one below costa, one in middle, and one above innermargin; median not traceable; second strongly curved outwards in middle, sinuate above and below and edged posteriorly throughout by a series of moderate ochreous-white spots; subterminal thick, waved, almost similar and parallel to second line; veins towards termen faintly outlined with ochreous; cilia dark fuscous, with ochreous dots at extremities of veins. Hindwings with termen

as in forewings; color and cilia as in forewings, but basal third of wing and along costa much paler and without any bluish-metallic tinge.

Mackay, Queensland; one specimen in October.

OPHIUSIDÆ.

Hamodes pseudoptera, n. sp.

Male, 64 mm. Head and thorax light ochreous-fuscous, collar black. Antennæ fuscous. Palpi dark fuscous. Legs and abdomen dark fuscous, anterior coxæ ochreous-fuscous. Forewings elongate, triangular, costa faintly sinuate, termen strongly rounded, continuous with innermargin; bright ochreous-fuscous; a round fuscous spot in cell; an inwardly oblique blackish fascia, from costa before middle to half across wing, narrowed beneath; a dark fuscous shade from costa at three-fourths, thence curved and narrowed down to below middle of wing, inclining to be continued to innermargin at half, edged on lower portion by a very fine white line and posterior to that by a moderate ochreous-shade; ground color beyond dark fuscous, separation well defined, leaving a roundish spot of ground color between veins 6 and 7; reniform faintly indicated; an obscure series of fuscous lunate marks along termen; cilia ochreous. Hindwings with apex somewhat prominent; termen nearly straight; dark chestnut, suffusedly irrorated with dark fuscous; basal half of wing semi-transparent; cilia as in forewings. Underside of all wings thickly clothed with blackish hairs, except along innermargin of forewings, which is semi-hyaline, and has a tuft of ochreous hairs at base.

A peculiar looking insect, and very different to any other Australian *Noctua* known to me; the absence of scales on the basal portion of hindwings is a noticeable point of distinction, and the hairy underside of wings is another curious character.

Cooktown, Queensland; one specimen in October.

Ophiusa diagarmma, n. sp.

Female, 34 mm. Head, palpi, antennæ, thorax, legs, and abdomen fuscous. Forewings elongate, moderate, costa nearly straight, termen faintly waved, obliquely rounded: dark fuscous; an oblique narrow ochreous streak from one-fourth costa to one-third innermargin, edged anteriorly with a blackish shade; a similar streak from costa at two-thirds to innermargin at three-fourths, strongly bowed outwards on middle third, edged anteriorly by a broad fuscous-blackish shade, which

becomes smoky-brown on anterior half; a blackish-fuscous apical patch, becoming lighter anteriorly and finely edging second line posteriorly throughout; ground color beyond suffused with whitish; cilia fuscous, with a darker fuscous median line and black spots at extremities of veins. Hindwings with termen slightly waved, rounded; dark fuscous; an obscure whitish transverse ante-median fascia, obscure on lower half; an obscure whitish elongate patch on termen towards anal angle; cilia white, becoming fuscous at apex and middle of termen.

Mackay, Queensland; Derby, Western Australia; two specimens in October and November.

Ophiusa monogona, n. sp.

Female, 46 mm. Head, palpi, and thorax light fuscous, palpi darker beneath. Antennæ ochreous. Abdomen greyish-ochreous. Legs fuscous, tibiæ and tarsi banded with whitish. Forewings elongate, moderate, costa nearly straight, termen faintly waved, obliquely rounded; light ochreous-fuscous; a fine obscure fuscous line at one-sixth, a second, nearly straight, and edged anteriorly with its own width of dull ochreous, from costa at one-fourth to about one-third of innermargin; a small whitish dot below costa beyond; a fine ochreous line from costa at three-fourths to innermargin before anal angle, with a strong outward projection above middle, and strongly curved inwards below; groundcolor between second and this line becoming fuscous especially on post-median portion, which appears to be divided by a faint fuscous transverse line throughout; a dull fuscous-reddish triangular apical spot; a fuscous line along termen; cilia fuscous. Hindwings with rounded, waved; dark fuscous; indications of two faint whitish postmedian lines, space between darker fuscous; cilia white, becoming fuscous on median portion. Underside of all wings pale ochreous-fuscous.

Somewhat allied to *melicerte*, Dru., but the form of the lines is totally different.

Mackay, Queensland; one specimen in November.

Grammodes callixeris, n. sp.

Female, 36 mm. Head, palpi, and thorax fuscous, antennæ whitish, abdomen ochreous. Legs fuscous-whitish. Forewings elongate, triangular, costa hardly arched, termen straight on upper two-thirds, thence rounded to anal angle; fuscous-whitish, costal edge broadly whitish, strongly irrorated with

fuscous; a large dark fuscous triangular patch lying on inner margin, apex reaching nearly to costa; anterior edge from just before base, edged with a line of ochreous-white posterior edge, slightly sinuate, terminating on innermargin at three-fourths, with a sharp angulation above innermargin, sinuate portion edged as on anterior edge; a fuscous triangular spot on costa near apex continued as a line to middle of wing; an obscure subterminal fuscous line; faint fuscous line along termen; cilia dark fuscous. Hindwings with termen rounded; bright orange; a black band along termen, broadest at apex, and indented before anal angle.

The British Museum has this species unnamed from Port Darwin.

Cooktown, Queensland; one specimen in November.

Fodina chrysomera, n. sp.

Female, 28 mm. Head, palpi, and thorax dark fuscous, patagia whitish. Antennæ ochreous, fillet whitish. Abdomen yellow. Legs ochreous. Forewings elongate, triangular, costa almost straight, termen nearly rectangular, black, with reddish-ochreous markings, somewhat carmine-tinged; a moderately thick oblique streak from innermargin close to base just below middle of costa; a broad oblique streak from apex of preceding streak to termen just above anal angle, thus enclosing a large triangular patch of ground color, which is only separated from innermargin by a streak of yellowish, which is continued the whole length of innermargin; a narrow transverse streak from costa at four-fifths to posterior extremity of second streak, gently curved outwards on upper half; a narrow streak along termen; cilia blackish. Hindwings with termen rounded; bright orange; a moderate black band along termen, containing a streak of crimson along lower half; cilia as in forewings.

Broken Hill, New South Wales; one specimen in March.

NOCTUINA.

Corula (?) mesoleuca, n. sp.

Male, 30 mm. Head, palpi, and thorax light fuscous. Antennæ, abdomen, and legs grey. Forewings elongate, triangular, costa moderately arched, termen rounded; light brownish; a pair of nearly parallel dark fuscous lines, first at one-fourth, second just beyond, limiting median patch, and tending to be furcate on lower third; ground color between last line and base somewhat darker than rest of wing; a rather

broad transverse white fascia in middle of wing reaching both margins, much dilated on lower half; anterior edge straight; posterior edge dentate; a suffused dentate fuscous subterminal line, dentations appearing to be continued along veins towards termen; cilia whitish, basal half fuscous, spotted with dark fuscous at extremities of veins. Hindwings with termen rounded; dull whitish, suffused with light fuscous along termen, and more broadly towards apex; cilia whitish, with a fuscous parting line.

Not unlike specimens of *Nola*, (*Nolidæ*).

Cooktown, Queensland; one specimen.

Corula hypotherma, n. sp.

Female, 26 mm. Head, palpi, and thorax ashy-grey. Antennæ fuscous. Abdomen reddish. Legs grey-whitish, tibiæ and tarsi fuscous, ringed with whitish. Forewings elongate, dilated posteriorly, costa gently arched, termen oblique, bowed in middle; ashy-grey-fuscous, becoming whitish in middle of wing; lines blackish; rather obscure; an oblique line from one-fourth of costa to one-fourth of innermargin; a second, finely dentate throughout, nearly straight, from costa at about two-thirds to innermargin before two-thirds, slightly angulated in middle; subterminal nearly straight, white preceded by a fuscous shade; a row of black dots before and parallel to termen; cilia flesh color. Hindwings with termen somewhat sinuate in middle, at apex and above innermargin somewhat prominent; dull fleshy-red; a broad, blackish band along termen; cilia as in forewings.

Mackay, Queensland; one specimen in December.

FOCILLIDÆ.

Zethes syndesma, n. sp.

Male, 26 mm. Head and thorax greyish-fuscous. Palpi fuscous. Abdomen grey. Antennæ fuscous. Legs white, tarsi fuscous, banded with whitish. Forewings elongate, triangular, costa hardly arched, termen dentate, strongly angulated in middle; greyish, irregularly suffused with fuscous, especially median third of wing, which is limited anteriorly by a curved suffused line at one-third, and posteriorly by dentate line two-thirds of costa to beyond middle of innermargin curved outwards on upper half, a waved dull whitish subterminal from costa at four-fifths to innermargin before anal angle, edged posteriorly by its own width of fuscous; ground color between this and posterior line of median band much lighter and clearer; ground color beyond subter-

minal, darker fuscous on upper half; a short whitish oblique streak from apex; an indistinct row of fuscous dots before termen; cilia greyish, with a fuscous median line. Hindwings with termen dentate; pale slaty-grey, becoming light fuscous on basal fourth; lines and dots as in forewings, lines rather indistinct; cilia greyish.

Mackay, Queensland; one specimen in November.

EGNASIA PSAMMOCHROA, n. sp.

Male, 30 mm. Head and thorax greyish-ochreous. Palpi grey-whitish, coxæ ochreous, abdomen greyish-ochreous. Forewings elongate, triangular, costa hardly arched, termen somewhat bowed, oblique, faintly sinuate beneath apex; ochreous, suffused with light fuscous; a fine obscure fuscous line from one-third of costa to innermargin at one-fourth, hardly traceable on lower half; a fine fuscous dentate line from costa at four-fifths to innermargin at two-thirds, gently curved outwards throughout, followed on costa by a minute whitish spot, a similar spot on costa at five-sixths, from which proceeds a subterminal row of small black dots, parallel to termen; ground color between dots and line tinged with ochreous ferruginous; orbicular small, obscure, whitish; reniform elongate, narrow, strongly indented in middle, edged above and below by a short median shade, which reaches costa, but not innermargin; cilia greyish-ochreous. Hindwings with termen faintly angulated in middle; first, subterminal lines and dots as in forewings; cilia as in forewings. Underside of hindwings with small whitish discal ring edged with fuscous.

Mackay, Queensland; one specimen in December.

THERMESIIDÆ.

CAPNODES NIPHOMACULA, n. sp.

Female, 36 mm. Head, palpi, antennæ, thorax, legs, and abdomen light brownish-ochreous, palpi with a snow-white spot at apex of terminal joint, antennæ with a snow-white spot at base of antennæ, legs and abdomen ochreous beneath. Forewings elongate, triangular, costa gently arched, termen rounded, oblique; light brownish-ochreous; markings snow-white; a spot on base of costa; a second on base of innermargin; a third on costa at one-fourth, another on costa beyond middle; a fifth in disc below third; sixth on fold obliquely below fifth; a seventh on fold just beyond; and a curved row of about six smaller ones in middle of wing at about two-thirds from base; an obscure series of small whitish-

becomes smoky-brown on anterior half; a blackish-fuscous apical patch, becoming lighter anteriorly and finely edging second line posteriorly throughout; ground color beyond suffused with whitish; cilia fuscous, with a darker fuscous median line and black spots at extremities of veins. Hindwings with termen slightly waved, rounded; dark fuscous; an obscure whitish transverse ante-median fascia, obscure on lower half; an obscure whitish elongate patch on termen towards anal angle; cilia white, becoming fuscous at apex and middle of termen.

Mackay, Queensland; Derby, Western Australia; two specimens in October and November.

Ophiusa monogona, n. sp.

Female, 46 mm. Head, palpi, and thorax light fuscous, palpi darker beneath. Antennæ ochreous. Abdomen greyish-ochreous. Legs fuscous, tibiæ and tarsi banded with whitish. Forewings elongate, moderate, costa nearly straight, termen faintly waved, obliquely rounded; light ochreous-fuscous; a fine obscure fuscous line at one-sixth, a second, nearly straight, and edged anteriorly with its own width of dull ochreous, from costa at one-fourth to about one-third of innermargin; a small whitish dot below costa beyond; a fine ochreous line from costa at three-fourths to innermargin before anal angle, with a strong outward projection above middle, and strongly curved inwards below; groundcolor between second and this line becoming fuscous especially on post-median portion, which appears to be divided by a faint fuscous transverse line throughout; a dull fuscous-reddish triangular apical spot; a fuscous line along termen; cilia fuscous. Hindwings with rounded, waved; dark fuscous; indications of two faint whitish postmedian lines, space between darker fuscous; cilia white, becoming fuscous on median portion. Underside of all wings pale ochreous-fuscous.

Somewhat allied to *melicerte*, Dru., but the form of the lines is totally different.

Mackay, Queensland; one specimen in November.

Grammodes callixeris, n. sp.

Female, 36 mm. Head, palpi, and thorax fuscous, antennæ whitish, abdomen ochreous. Legs fuscous-whitish. Forewings elongate, triangular, costa hardly arched, termen straight on upper two-thirds, thence rounded to anal angle; fuscous-whitish, costal edge broadly whitish, strongly irrorated with

markings as in forewings, but subterminal entire and better defined; cilia as in forewings.

Cooktown, Queensland; one specimen in October.

ERASTRIANÆ.

Raparna marmorea, n. sp.

Female, 25 mm. Head, palpi, antennæ, thorax, and abdomen light reddish-ochreous. Legs greyish. Forewings elongate, moderate, costa hardly arched, termen rounded, oblique, apex somewhat prominent; ochreous, mixed with dull reddish; two or three irregular streaks of dull reddish from costa towards innermargin; two small black dots, transversely placed, in middle of disc; a broad coppery-purplish patch, outer edge nearly straight from costa at apex to innermargin at one-fourth, dark anteriorly, and containing a large roundish spot of ground color at anal angle, mixed with reddish and with a fine waved whitish line, indicating subterminal, in middle; a fine bluish-metallic waved line, from costa before apex to innermargin at two-thirds, indented at one-third and with a strong sinuation below middle; a row of blackish dots before termen, more or less edged posteriorly with dull purplish flecks; cilia ochreous, at base blackish. Hindwings with termen waved, prominent in middle and below apex; light coppery purplish; basal one-sixth of wing ochreous, separation well defined; a post-median band of light reddish orange, containing on innermargin near a short irregular streak of deep reddish scales; blackish dots along termen as in forewings; a fine fuscous line along termen; cilia dull reddish-orange.

A beautifully marked insect.

Duaringa, Queensland; one specimen in November.

Raparna byrsopa, n. sp.

Female, 24 mm. Head, palpi, and thorax blackish, head and thorax mixed with dull whitish, palpi internally dull-ochreous. Antennæ fuscous. Legs greyish. Forewings elongate, triangular, costa slightly arched, termen slightly waved, rounded; blackish-fuscous, crossed by several waved irregular transverse dull whitish lines; all markings except median line obscured by general ground color; median line moderately thick, black angulated outwards above middle, from before middle of costa to before middle of innermargin; subterminal line dull whitish, moderately prominent, waved; a row of sharply defined black dots along termen, preceded by a row of similar sized whitish dots; cilia dark fuscous. Hindwings with termen waved; color, markings, and cilia as in

forewings; first line just traceable and containing in its centre a roundish ring of blackish scales.

Cooktown, Queensland; one specimen in December.

METACHROSTIS SCIAPTERA, n. sp.

Male, 22 mm. Head, palpi, antennæ, thorax, and abdomen fuscous, abdomen darker, anal tuft greyish-ochreous. Legs dark fuscous, more or less ringed with whitish-ochreous. Forewings elongate, triangular, costa slightly arched, termen oblique, faintly waved; light fuscous, median two-thirds of wing dark fuscous, limited anteriorly by first line, posteriorly by second line; first line waved, becoming dark fuscous below middle; median gently curved throughout, fine, waved; second from costa just above reniform to just beyond two-thirds of innermargin, with a strong angulation beneath costa, thence oblique to termination; orbicular indistinct; reniform large, placed somewhat obliquely, whitish, edged on either side with a short patch of dark fuscous; subterminal absent; area of wing beyond lighter than rest; a row of small black marks along termen; cilia light fuscous. Hindwings light fuscous; base slightly clothed with greyish-ochreous hairs; cilia fuscous-whitish.

Mackay, Queensland; one specimen in October.

BLEPTINA ODONTIAS, n. sp.

Male, 30 mm. Head, palpi, thorax, antennæ, and abdomen light ochreous-fuscous. Legs ochreous, tibiæ and tarsi dark fuscous. Forewings elongate, triangular; costa gently arched, termen not waved, obliquely rounded; light ochreous, faintly tinged with fuscous; lines fuscous, very fine, obscure; first waved, indented below costa and slightly angulated outwards above innermargin; median not traceable; second nearly straight, strongly dentate throughout, slightly curved beneath costa; subterminal grey-whitish, waved; angulated outwards above and below middle, and edged anteriorly by a narrow fuscous shade, and posteriorly by a similar shade, excepting in middle; a row of small black marks along termen; cilia ochreous. Hindwings with termen rounded; a fuscous discal spot; second, subterminal line and shades and dots as in forewings, but dots more elongate; cilia ochreous.

Mackay, Queensland; one specimen in October.

PLUSIADÆ.

PROCONIS EULOPHA, n. sp.

Male, 28 mm. Head, palpi, and thorax cinereous-fuscous, antennæ fuscous, pectinations 6, ochreous. Legs and abdomen

greyish-ochreous, crest of abdomen fuscous. Forewings elongate, moderate, costa moderately arched, termen waved, rounded; cinereous-fuscous, markings black; a fine line from costa at one-third to innermargin at one-third, strongly sinuate inwards in middle, angulated above innermargin; a fine thrice-waved line from anterior edge of reniform to three-fourths innermargin; a twice-waved line from costa at three-fourths curved around strongly to lower edge of reniform, some short oblique strigulations along costa; a fine waved line along termen; orbicular indistinct; reniform elongate, outlined with a fine black line; cilia cinereous-fuscous. Hindwings with termen unevenly waved; white; a fine fuscous line along termen; cilia white, with some blackish points at extremities of veins.

Broken Hill, New South Wales; one specimen in May.

PROROCOPIS STENOTA, n. sp.

Female, 25 mm. Head, palpi, antennæ, and thorax ashy-grey-fuscous, palpi beneath grey-whitish. Legs and abdomen whitish. Forewings elongate, dilated posteriorly, costa hardly arched, termen waved, oblique; ashy-grey-whitish, more or less very finely strigulated with blackish; a fine nearly straight black line from costa at one-sixth to three-fourths across wing; a nearly straight thicker black line, from one-third of costa to one-third innermargin; a moderately thick black line from costa at about two-thirds to about two-thirds across wing, thence curved up to near costa and thence curved again and returning to innermargin beyond two-thirds; a suffused nearly straight blackish line between first and second lines; submarginal line obscure, preceded by two or three similar lines, most noticeable on innermargin; a fine shortly waved black line from apex, thence curved outwards and ending on termen above anal angle; a short blackish line at anal angle; a fine black waved line along termen; cilia ashy-grey-whitish. Hindwings with termen rounded, faintly waved; white; a moderately broad blackish band along termen, upper edge almost straight; line along termen as in forewings; cilia white. Underside of forewing silvery-whitish, with a fuscous apical patch.

Broken Hill, New South Wales; one specimen in October.

PROROCOPIS ADELOPIS, n. sp.

Male, 27 mm. Head, palpi, antennæ, and thorax cinereous-grey, palpi beneath whitish, thorax with an erect dense posterior crest. Abdomen whitish-grey, with a blackish crest on

basal segment. Legs whitish-fuscous, tibiæ and tarsi dark fuscous, suffusedly banded with whitish. Forewings elongate, dilated posteriorly, costa gently arched, termen faintly waved, oblique; cinereous-grey; markings black, rather obscure; first close to base, with two acute angulations below costa, thence curved around and ending on innermargin at one-sixth; a similar line, from costa at one-third to innermargin at one-third; a faint blackish-edged whitish spot below costa beyond, indicating orbicular; reniform large outlined with fine black line, and filled in with cinereous-grey; second line from costa before reniform, thence along upper edge of same, and thence very strongly curved outwards to considerably beyond, and again returning to lower edge of reniform, thence sinuate inwards, finally ending on innermargin at four-fifths; subterminal obscure, waved, hardly traceable; a waved line along termen; cilia ashy-grey-fuscous. Hindwings with termen faintly waved, rounded; dull white; a faint fuscous band along termen; cilia white. Underside of forewings silvery-whitish without markings.

Allied to the preceding, but the angulated first and median lines and almost unicolorous hindwings are good distinctive points.

Broken Hill, New South Wales; one specimen in October.

PROROCOPIS LEUCOCROSSA, n. sp.

Male, 28 mm. Head, palpi, antennæ, and thorax cinereous-grey, palpi whitish beneath. Legs whitish, tibiæ and tarsi fuscous, obscurely banded with whitish. Abdomen ochreous-fuscous. Forewings elongate, moderately dilated posteriorly; termen waved, obliquely rounded; lines black, fairly well defined; a short outwards line at one-sixth of costa; first line moderately and evenly curved outwards, with a slight projection above middle; median line indistinct, only noticeable on costa; second line and reniform spot formed as in *adelopis*; a very pale whitish transverse streak from costa at five-sixths to more than two-thirds across wing; subterminal obscure, fuscous, just beyond; a waved black line along termen; cilia cinereous-grey, with fuscous streaks at extremities of veins. Hindwings with termen gently waved; whitish-fuscous, posterior half of wing fuscous, deeper along termen; cilia white.

Very close to the previous species, but differs in shape and form of lines, and absence of crests.

Broken Hill, New South Wales; one specimen in October.

HYPENINÆ.

AVITTA EURRHOA, n. sp.

Female, 54 mm. Head, palpi, antennæ, thorax, and abdomen ochreous-fuscous, palpi dark fuscous externally. Legs dark fuscous, anterior tibiæ ochreous-whitish. Forewings elongate, triangular, costa hardly arched, termen rounded; ochreous-fuscous; markings fuscous, moderately developed; a short curved mark near base of costa; a moderately broad fascia from costa at one-fourth to innermargin at one-fourth; a parallel fascia from costa at about one-fourth to innermargin at one-fourth; a broader fascia from costa at about two-thirds to middle of innermargin, anterior edge oblique, darker fuscous, with a slight angulation above innermargin, posterior edge obscure, slightly angulated in middle; a broad band along terminal third of wing, anterior edge irregular, sinuate in middle, from costa at four-fifths to innermargin at about two-thirds; a row of obscure fuscous dots along termen; cilia fuscous. Hindwings unevenly waved; dark, fuscous, lighter or basal third and with some scattered blackish strigulæ towards terminal area; cilia fuscous.

Mackay, Queensland; one specimen in October.

LABANDA AMABILIS, n. sp.

Female, 36 mm. Head and thorax fuscous, suffusedly mixed with mossy-green. Antennæ and palpi fuscous. Abdomen and legs ochreous-orange, legs beneath whitish. Forewings elongate, triangular costa gently arched, termen rounded; dark fuscous, strongly and suffusedly mixed with moss-green and whitish scales; markings fuscous, tolerably well developed; a waved line from costa at one-fifth of costa to one-fifth innermargin; median line, strongly waved and with strong indentations below costa and above innermargin; ground color between first and median lines darker fuscous; second line, strongly dentate throughout and with a tri-dentate projection in middle, edged above and below mixed with whitish scales, more pronounced on lower portion; subterminal moderately straight, rather obscure on upper half; a short upwardly oblique streak from about middle of termen to above middle of subterminal; a short streak along upper third of termen; a fine line along termen; cilia blackish. Hindwings with termen rounded; bright orange; a fuscous band along termen, broadest at apex and gradually narrowing to extremity; cilia fuscous.

A handsome and easily recognised species.

Mackay, Queensland; one specimen in October. I have seen a specimen from Cooktown, Queensland.

Xanthoptera euchrysa, n. sp.

Female, 20 mm. Head, palpi, antennæ, and thorax dull reddish-fuscous. Abdomen and legs whitish, abdomen reddish-tinged. Forewings elongate-triangular, costa hardly arched, termen oblique, slightly prominent in middle; dull ochreous-brownish; lines whitish, waved, edged anteriorly with fuscous; first twice curved, very close to base; median with three nearly even curves, from before middle of costa to before middle of innermargin; a subterminal waved white line, anteriorly edged with fuscous, from costa before apex to innermargin before three-fourths; orbicular white, fuscous, ringed with white; reniform large, white, centred with light fuscous; terminal area of wing whitish-fuscous; a fuscous line along termen; cilia fuscous. Hindwings with termen rounded; fuscous; cilia as in forewings.

Cooktown, Queensland; one specimen in October.

Xanthoptera macrosema, n. sp.

Female, 24 mm. Head, palpi, antennæ, and thorax fuscous, palpi with two fuscous bands. Legs fuscous. Abdomen greyish. Forewings elongate, triangular, costa slightly arched, termen hardly waved, obliquely rounded; fuscous, suffusedly irrorated on either side of median third with fine whitish scales; first line dentate, black; a dull whitish mark on costa at one-fourth, from posterior edge which precedes median line to just beyond one-third of innermargin; second line curved outwards on upper half, sinuate on lower half, edged anteriorly on upper half by short streaks of black, which become more elongate on lower half; a parallel row of fine white points immediately beyond second line; subterminal irregularly waved, sinuate above and below middle, more or less edged anteriorly with blackish streaks; a row of lunate marks along termen; cilia fuscous. Hindwings with termen unevenly waved, faintly indicated; fuscous; cilia greyish, with a fuscous median line.

Brisbane, Queensland; one specimen in October.

Mecistoptera lithochroa, n. sp.

Female, 24 mm. Head, palpi, antennæ, thorax, legs, and abdomen whitish. Forewings elongate, triangular, costa gently arched, apex produced, termen prominent in middle, sinuate beneath apex; dull whitish, with a few scattered fuscous scales; an interrupted subterminal row of small suffused blackish spots, most prominent below costa, where there are two larger in middle; a fine fuscous line along termen; cilia

grey-whitish. Hindwings with termen rounded; dull whitish, faintly fuscous-tinged on posterior half; cilia as in forewings.

Duaringa, Queensland; one specimen in December.

Hypena (?) rhynchophora.

Male, 14 mm. Head, palpi, antennæ, thorax, and abdomen greyish-fuscous, palpi darker internally, antennæ strongly biciliated. Legs dull whitish. Forewings elongate, triangular, costa moderately arched, termen oblique; light fuscous; lines blackish, more or less interrupted into spots; first moderately straight; median angulated above middle, from middle of costa to just beyond middle of innermargin, edged posteriorly by some whitish dots, becoming ochreous on angulation; an outwards curved line in disc at two-thirds, with one or two white dots posteriorly; a row of elongate dots along termen, faintly edged anteriorly with whitish; orbicular, fuscous, spot-like; reniform represented by the ochreous spot on angulation of median line; cilia ochreous-fuscous. Hindwings fuscous, lighter on basal half; cilia as in forewings.

Not unlike some species of *Sorocostia* (*Nolidæ*).

Cooktown, Queensland; one specimen in November.

Hypena melasticta, n. sp.

Male, 30 mm. Head, palpi, antennæ, thorax, legs, and abdomen dark smoky-fuscous. Forewings elongate, triangular, costa hardly arched, termen faintly waved, apex somewhat pointed, more or less bowed in middle; dark smoky-fuscous; first and median lines obscured; second line from costa beyond two-thirds to innermargin beyond two-thirds, with two angulations above and below middle, edged posteriorly by a fine line of dull ochreous; wing from this line to base darker than rest; two black posteriorly whitish edged spots beneath costa near apex; and indications of two or three similar spots below; terminal area of wing irregularly mixed with bluish-white minute scales; a fine fuscous line along termen; cilia fuscous, with faint ochreous points at extremities of veins. Hindwings with termen slightly waved, rounded; dark fuscous, somewhat bronzy-tinged; cilia as in forewings.

Mackay, Queensland; one specimen in October.

PYRALIDINA.

GALLERIANÆ.

Melissoblaptes agramma, n. sp.

Female, 16 mm. Head, palpi, antennæ, and thorax cinereous-grey. Abdomen greyish-ochreous, with some silvery-

white scales. Legs greyish. Forewings rather narrow, elongate, costa strongly arched, termen very oblique; cinereous-grey, with a few black scales, and indications of whitish interneural streaks towards termen; a suffused dark fuscous patch of scales, resting on basal fourth of wing; a fine fuscous line along termen; cilia greyish-fuscous. Hindwings with termen nearly straight, apex prominent, pale grey-whitish, darker along termen; cilia whitish-grey.

Mackay, Queensland; one specimen in poor condition in October.

ELDANA LEUCOSTICTALIS, n. sp.

Male, 26 mm. Head, palpi, antennæ, and thorax pale fleshy-red. Legs fleshy-white. Abdomen greyish-ochreous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; deep fleshy-red, deepest on costal half; a small dull whitish spot in middle of wing at one-third from base; a second, much smaller in a longitudinal line at one-third, and a third midway between these two; cilia deep reddish. Hindwings with termen rounded, slightly sinuate beneath apex, apex prominent; greyish, faintly tinged with fuscous, on posterior half; cilia light fleshy-red, with a dark fuscous subbasal line.

Brisbane, Queensland; one specimen in January.

CRAMBINÆ.

CIRRHOCHRISTA CYCLOPHORA, n. sp.

Male, 24 mm. Head, palpi, antennæ, thorax, legs, and abdomen snow-white, palpi laterally orange, anterior tibiæ and tarsi orange, tarsi with whitish wings, middle and posterior legs mixed with orange; forewings elongate, triangular, costa nearly straight, termen oblique; snow-white; a narrow orange costal streak throughout; a small triangular fuscous tooth on lower edge at one-third, emitting an almost straight ferruginous interrupted line to innermargin at two-fifths; a similar tooth from lower edge of costal streak beyond middle, accompanied by a spot below; an oval fuscous ring just below spot midway between it and innermargin; a fine waved fuscous line, from costa at four-fifths to innermargin at four-fifths; a well-defined deep fuscous somewhat lunulate line along termen, very shortly continued along veins; cilia ochreous-fuscous, deeper on basal half. Hindwings with termen rounded; color, posterior and line along termen as in forewings; cilia as in forewings, becoming snow-white at anal angle.

Mackay, Queensland; one specimen in October.

I have seen specimens from Townsville.

Crambus photoleuca, n. sp.

Female, 16 mm. Head, palpi, thorax, and abdomen snow-white; palpi fuscous laterally. Antennæ fuscous. Legs white, strongly suffused with ochreous-fuscous. Forewings elongate, moderate, costa gently arched, termen oblique; shining snow-white; markings pale fuscous, obscure; one or two elongate streaks along costa, from one at three-fourths proceeds a fine line curved outwards to before middle of termen, thence continued before and parallel with termen to innermargin before anal angle; a small ferruginous spot on costa near apex; a fine line along termen, cilia shining snow-white, with two or three fuscous dots on middle of termen. Hindwings with termen rounded; very pale whitish-fuscous; cilia snow-white. Underside of forewings fuscous, of hindwings snow-white.

A peculiar and noticeable point is the reversal of colors on underside of wings.

Mackay, Queensland; one specimen in January.

Talis stenipteralis, n. sp.

Male, 20 mm. Head, palpi, thorax, and legs dull ochreous-fuscous, palpi six times as long as eye. Antennæ whitish, ciliations (1), fuscous, abdomen greyish-ochreous. Forewings rather narrow, elongate, apex nearly straight, termen very oblique; dull ochreous-fuscous; a narrow ochreous-white subcostal streak from base to three-fourths, edged below by its own width of dark fuscous, which color becomes trifurcate at extremity, and is continued along veins to termen; a narrower ochreous white line just beneath fuscous streak from base to three-fourths, and a similar one along fold, both more or less edged with fuscous; dorsal area of wing paler than rest, and minutely irrorated with fuscous and blackish scales; cilia ochreous-fuscous. Hindwings with termen faintly sinuate in middle; light fuscous; cilia greyish fuscous.

A peculiar-looking insect, not very near any of the other described species; it is, perhaps, nearest *cyclosema*, Lower.

Broken Hill, New South Wales; one specimen in October.

Talis eremenopa, n. sp.

Female, 16 mm. Head, palpi, antennæ, thorax, and legs fuscous, palpi 4, whitish internally. Abdomen greyish-ochreous, anal tuft whitish. Forewings elongate, triangular, costa nearly straight, termen oblique; ochreous-fuscous, suffusedly mixed with white, and with scattered blackish scales; an elongate-cuneiform white streak from base to beyond middle.

broadest posteriorly; a black-edged reniform discal spot in middle at two-thirds, centred with white, anteriorly broadly edged by an oblique streak of white, which reaches from costa to two-thirds across wing; a broad leaden-metallic transverse patch of scales beyond discal spot, from upper edge of spot to innermargin at anal angle; a white costal patch immediately above; a gently curved ochreous streak from costa beyond last spot to anal angle, bordering the leaden metallic patch posteriorly and becoming golden metallic on lower two-thirds; six short black elongate streaks before termen, resting upon three white spots; one at apex, curved; one in middle, cuneiform; and one somewhat quadrate above anal angle; a narrow white streak along termen; cilia ochreous-fuscous, barred with snow-white. Hindwings with termen rounded, faintly sinuate beneath apex; shining whitish-grey, thinly scaled; a fuscous line along termen; cilia shining snow-white.

Another species of doubtful affinity.

Stawell, Victoria; one specimen in April.

ANERASTINÆ.

Anerastia minoralis, n. sp.

Male, 12 mm. Head, palpi, antennæ, and legs light-ochreous-fuscous, abdomen greyish-ochreous. Forewings elongate, moderate, costa moderately arched, termen oblique; light ochreous; a silvery-white longitudinal line from base to apex, commencing beneath costa at base and reaching costa before apex, edged at apex beneath with fuscous; a similar streak along fold, from base to termen, obscure; cilia greyish-ochreous, paler at base. Hindwings with termen rounded; light greyish-fuscous; cilia grey, with a light fuscous, basal line.

Mackay, Queensland; one specimen in October.

Anerastia xiphimela, n. sp.

Male, 20 mm. Head, palpi, antennæ, legs, and abdomen dark fuscous. Abdomen ochreous-grey. Forewings elongate, moderate, costa gently arched, termen oblique, rounded beneath; pale fleshy-red, fuscous tinged; veins faintly outlined with fuscous; a moderately thick blackish longitudinal streak, broadest on posterior half, from beneath costa at base to termen below apex; a fuscous irregular suffusion on middle of innermargin; a few fuscous dots below streak at one-third; cilia dull fleshy-red. Hindwings with termen rounded; pale greyish, thinly scaled; a fuscous line along termen on upper half; cilia greyish, with a fuscous basal line.

Cooktown, Queensland; one specimen in August.

Phycita deltophora, n. sp.

Male, 25 mm. Head, palpi, antennæ, thorax, and abdomen cinereous-grey, palpi ferruginous at apex. Legs silvery-whitish, mixed and banded with fuscous. Forewings elongate, moderate, costa rather strongly arched, termen oblique; cinereous-grey, finely irrorated with dark fuscous; an elongate, somewhat cuneiform reddish-fuscous fascia from one-third costa to one-third innermargin, slightly oblique, edged on sides with a dentate black line; and rather broadly posteriorly with a whitish fascia, sharply defined anteriorly, posteriorly suffused with a short angulated line in middle on lower half; a dull whitish mark on costa at four-fifths, from which proceeds an obscure, slightly outwards whitish curved line of dots to innermargin before anal angle, edged anteriorly with fuscous; a black interrupted line along termen, separated by streaks of dull whitish. Hindwings with termen rounded; greyish, thinly scaled; a fine fuscous line along termen; cilia greyish, with a fuscous, subterminal line.

Mackay, Queensland; one specimen in November.

Phycita leucomilta, n. sp.

Male and female, 28 mm. Head, palpi, antennæ, thorax, legs, and abdomen reddish-ferruginous, more or less finely irrorated with bluish-white scales in female. Forewings elongate, moderate, costa moderately arched, termen slightly bowed, oblique; reddish-ferruginous in female more or less minutely irrorated throughout with bluish-white scales, base of wing ferruginous; a narrow outwardly fleshy-white narrow fascia, from costa at one-third to innermargin before middle, posteriorly edged by a somewhat cuneiform patch of darker ground color; a narrow fleshy-white line from costa at four-fifths to innermargin before anal angle, strongly curved outwards in middle, edged on upper third by a patch of darker ground color; a lighter patch of ground color just before this; a row of small black spots along termen; all markings in female obliterated by general ground color; cilia fleshy-red, with a clear whitish median line. Hindwings greyish-ochreous; cilia ochreous, basal half reddish.

Not unlike *Euzophera pyrrhoptera*, Lower, but the palpi make it easy of separation from that species.

Mackay, Queensland; two specimens in October.

Nephopteryx orthozona, n. sp.

Female, 20 mm. Head, palpi, antennæ, and legs cinereous-grey, basal joint of palpi fuscous. Abdomen greyish-ochreous.

Forewings elongate, moderate, costa gently arched, termen oblique, faintly sinuate beneath apex; cinereous-grey; a fine black slightly curved line, from costa near middle to innermargin in middle, anteriorly edged with its equal width of white; a second similar line from costa at four-fifths to innermargin before anal angle, gently curved outwards in middle, and edged by a parallel line of fuscous, separated by a line of ground color; ground color between the two black lines strongly suffused with white, especially on lower half; a row of fine black dots along termen; cilia cinereous-grey, with two darker fuscous lines. Hindwings with termen rounded; greyish, thinly scaled; a fine fuscous line along termen; cilia greyish, with a fuscous subbasal line.

Cooktown, Queensland; one specimen in December.

NEPHOPTERYX EREBOSCOPA, n. sp.

Female, 28 mm. Head reddish, palpi, antennæ, thorax, and legs ashy-grey-fuscous, terminal joint of palpi fuscous, tibiæ and tarsi fuscous, with dull whitish rings. Forewings elongate, moderately dilated posteriorly, costa gently arched, termen rounded, oblique; deep ferruginous-fuscous, obscurely mixed with whitish; markings obscure; a short fuscous mark near base, edged with dull whitish basally; a moderately broad dull whitish fascia, from costa at one-fourth obliquely outwards to innermargin at about one-third, with a central ferruginous-fuscous streak throughout; a dark fuscous spot above middle in disc at two-thirds; a very dull whitish subterminal line, curved outwards in middle, edged anteriorly by a fuscous, somewhat dot-like line, and posteriorly by a fuscous shade; a row of small dots along termen; cilia fuscous-whitish, with a ferruginous median line. Hindwings with termen rounded; pale grey-whitish, becoming fuscous-tinged around apex and along termen; cilia grey-whitish, with a fuscous, subbasal line.

Brisbane, Queensland; one specimen in April.

I have a specimen from Cairns.

NEPHOPTERYX HADES, n. sp.

Female, 24 mm. Head, palpi, antennæ, thorax, legs, and abdomen dark fuscous, inclining to blackish, tibiæ and tarsi with faint whitish rings, abdomen with dull silvery-white segmental rings. Forewings elongate, moderately dilated posteriorly, costa gently arched, termen oblique; blackish; markings obscure; a faint blackish line from one-third costa to one-third innermargin; a blackish waved subterminal line, curved outwards in middle, followed by an obscure parallel blackish

shade; a row of black dots along termen; cilia blackish. Hindwings with termen irregularly rounded; pale grey-whitish, somewhat iridescent; costa, apex, and a line along termen fuscous-tinged; cilia greyish, with a fuscous subbasal line.

Appears to be somewhat allied to the preceding.

Brisbane and Mackay; two specimens in November.

NEPHOPTERYX DASYPTERA, n. sp.

Male and female, 18-22 mm. Head, palpi, antennæ, thorax, and legs ashy-grey-fuscous, paler in female; abdomen ashy-grey, more ochreous in female. Forewings elongate, moderately dilated, costa gently arched, termen obliquely rounded; dark fuscous, minutely irrorated with ashy-grey scales, so as to appear ashy-grey-fuscous; paler in female; lines very obscure; an outwardly oblique fuscous line from costa at one-third to innermargin at about middle, edged anteriorly by its own width of whitish; a waved fuscous subterminal line, followed by a parallel row of obscure fuscous spots; a row of black dots along termen; cilia cinereous-fuscous. Hindwings with termen unevenly rounded; greyish-fuscous, greyish in female, thinly scaled; cilia greyish, with a fuscous subbasal line.

Also allied to the two preceding; it is somewhat difficult to give reliable points of distinction, but the species when placed together are easily recognised. The present species differs by the shorter and narrower wings and obscure markings. The female is much whiter than the male, and the markings are almost obliterated.

Mackay, Queensland; two specimens in April.

NEPHOPTERYX THERMALOPHA, n. sp.

Male and female, 18-20 mm. Head, palpi, antennæ, thorax, legs, and abdomen cinereous-whitish. Forewings elongate, posterior moderately dilated; costa hardly arched, termen oblique, hardly rounded in male; cinereous-whitish; markings fuscous; a moderately broad fascia from costa at one-third to innermargin at one-third, curved outwards in middle, and edged anteriorly by a whitish shade; in female the fascia is fuscous without any white shade, that color being replaced by a dull ochreous streak, on which is placed a small tuft of raised blackish scales in middle; two small adjacent discal dots at two-thirds from base; a moderately thick fuscous line, from costa at three-fourths to innermargin at two-thirds strongly sinuate outwards in middle and edged posteriorly by its own width of whitish throughout, less developed in female; a row of black dots along termen; cilia cinereous-whitish. Hind-

wings with termen rounded, somewhat sinuate beneath termen; pale grey-whitish, somewhat iridescent; apex, costa, and line along termen fuscous; cilia grey-whitish; with an obscure fuscous subbasal line.

Not unlike *Phycita deltophora*, but the tuft of scales is a reliable point of distinction.

Brisbane and Mackay, Queensland; two specimens in December and January.

NEPHOPTERYX METASARCA, n. sp.

Male, 16 mm. Head, palpi, thorax, and legs cinereous-whitish. Antennæ and abdomen ochreous. Forewings elongate, moderately dilated posteriorly, costa slightly arched, termen oblique; fuscous-whitish; a nearly straight narrow transverse fascia at one-third; a second just beyond, narrower on lower half; interspace more white; a rather broad white transverse nearly straight fascia following second fuscous fascia, and containing a fuscous dot on posterior edge above middle; a faintly indicated subterminal whitish line, curved outwards in middle, edged on either with darker ground color; a row of fuscous dots along termen; cilia cinereous-fuscous. Hindwings with termen rounded; ochreous; cilia ochreous-grey.

Brisbane, Queensland; one specimen in January.

TEPHRIS GLAUCOBASIS, n. sp.

Female, 22 mm. Head dull whitish. Antennæ and palpi fuscous, palpi whitish beneath. Thorax and legs cinereous-whitish. Abdomen grey-whitish, anterior segment with metallic-coppery reflections. Forewings elongate, moderately dilated posteriorly, costa gently arched, termen oblique; ashy-grey fuscous; a whitish elongate patch from base to middle occupying upper half of wing; ground color below to inner-margin brownish-ochreous, mixed with blackish; an obscure rather thick short fascia at posterior end of elongate patch; below which is a small whitish space, upon which rests an elongate black mark; indications of a fuscous subterminal line, ground color beyond more whitish; a blackish spot above inner-margin; a row of black dots along termen; cilia ashy-grey, with a reddish terminal line and a row of black points at base. Hindwings with termen rounded; greyish-white, somewhat iridescent; thinly scaled; cilia greyish, with a fuscous subbasal line.

Mackay, Queensland; one specimen in November.

Euzopherodes allocrossa, n. sp.

Male, 14 mm. Head, thorax, abdomen, and legs cinereous-whitish, tibiæ and tarsi banded with fuscous. Palpi antennæ fuscous, palpi beneath ochreous. Forewings elongate, rather narrow, costa hardly arched, termen oblique, slightly rounded; cinereous-whitish, with well-defined black markings; a narrow fascia close to base, continued as a fine line shortly along innermargin, interrupted in middle of base; a narrow slightly inwards curved fascia, from costa at one-third to innermargin before middle, preceded by a small dot in middle; two small discal dots obliquely placed, at two-thirds from base; an oblique fine line, from costa at four-fifths to innermargin at four-fifths, angulated outwards at one-third; a row of small dots along termen; cilia ochreous-reddish. Hindwings with termen unevenly rounded; fuscous; cilia as in forewings and with a fuscous subbasal line.

Mackay, Queensland; one specimen in October.

Etiella holozona, n. sp.

Male, 24 mm. Head, palpi, antennæ, and thorax pale ochreous, palpi fuscous tinged beneath. Legs ochreous-whitish. Abdomen greyish-ochreous, anterior segments whitish. Forewings elongate, moderately dilated posteriorly, costa gently arched, termen obliquely rounded; pale ochreous, clearer on dorsal half; a moderate, straight, longitudinal silvery-white streak, from base to termen below apex, edged beneath throughout with a fuscous-ochreous streak, which is deflected downwards at two-thirds towards termen; cilia pale greyish-ochreous, with a whitish basal line. Hindwings with termen rounded; very pale fuscous-whitish; cilia white, with a fuscous subbasal line.

Brisbane, Queensland; one specimen in December.

Heterographis molybdophora, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, and abdomen pale whitish-ochreous, palpi internally whitish, patagia ochreous. Legs silvery-whitish, anterior pair fuscous-tinged. Forewings elongate, posteriorly gradually dilated, costa gently arched, termen obliquely rounded; pale ochreous; a narrow silvery-whitish longitudinal median streak, from base to near termen, edged above by a fine fuscous line throughout, and below by a similar line, which becomes broader and blue-whitish on posterior fourth; a small blackish dot above innermargin at one-third from base, apparently lying on a fine fuscous streak,

which extends along fold throughout; an elongate streak of bluish-white scales along costa from middle to apex; extremities attenuated; a rather broad leaden-metallic line along termen, separated at apex from preceding streak by an oblique streak of fuscous; cilia fuscous, with a blackish basal and white subbasal line. Hindwings with termen rounded; fuscous-whitish, paler on basal half; cilia greyish, with a fuscous subbasal line.

Derby, Western Australia; one specimen in May.

HETEROGRAPHIS PROLEUCA, n. sp.

Female, 20 mm. Head, palpi, antennæ, thorax, and legs dark coppery-fuscous, very suffusedly irrorated with whitish, tarsi black, with whitish rings, abdomen ochreous-grey, with indications of a dorsal series of fuscous marks on anterior segments. Forewings elongate, moderately dilated posteriorly, costa nearly straight, termen obliquely rounded; deep coppery-fuscous, very finely irrorated with whitish throughout; a moderately broad, rather suffused white subcostal streak from near base to near apex, leaving base and extreme costal edge reddish-coppery; a nearly straight fuscous line from beneath costal streak at one-third to innermargin at one-third; a dentate fuscous line from just before apex of white streak to anal angle, nearly straight; followed by a similar line midway between it and termen; a fine fuscous line along termen; cilia deep-coppery-fuscous, suffusedly mixed with whitish. Hindwings with termen rounded; pale greyish, thinly scaled; a fuscous line along termen; cilia grey-whitish, with a fuscous subbasal line.

Mackay, Queensland; one specimen in October.

Mr. Dodd, of Townsville, has recently sent me two specimens.

HOMÆOSOMA (?) MELANOSTICTA, n. sp.

Female, 22 mm. Head, palpi, thorax, and legs whitish. Antennæ fuscous. Abdomen ochreous. Forewings elongate, very little dilated, costa gently arched, termen obliquely rounded; pale whitish-ochreous, costal half whiter; markings fuscous; a fine streak along costa from base to apex, extremities attenuated, thickest beyond middle; an elongate spot on lower edge of cell; a second similar just below; a small spot beyond end of cell; an oblique series of dots, from costa before apex to innermargin before anal angle; a few blackish dots along termen; cilia ochreous-whitish. Hindwings with termen rounded; light fuscous; a fine line along termen; cilia grey-whitish.

Reminds one of a pale specimen of *Eucarphia tritalis*, Walk., at first sight.

Derby, Western Australia; one specimen in October.

EPIPASCHIANÆ.

JOCARA THERMOPTERA, n. sp.

Female, 20. mm. Head, palpi, antennæ, thorax, and legs fuscous, thorax with a large whitish quadrate spot, tibiæ and tarsi obscurely ringed with whitish. Abdomen dark fuscous, yellowish on sides and beneath. Forewings elongate, dilated posteriorly, costa gently arched, termen obliquely rounded; dark fuscous; darkest on basal half; a thrice sinuate oblique whitish line, from costa just beyond middle to innermargin just beyond middle, deeply indented below first sinuation; two small black dots transversely placed in disc beyond middle; a fuscous apical patch; ground color between this and white line light reddish; a small fuscous spot before apical patch; a row of fuscous dots along termen; cilia fleshy-red. Hindwings with termen rounded; bright orange; a moderate black apical patch; cilia orange, with a blackish tooth at apex.

Reminds one of *Titanoceros cataxantha*, Meyr.

Broken Hill, New South Wales; one specimen in March.

STERICTA ALEUROPA, n. sp.

Female, 24 mm. Head, palpi, antennæ, thorax ashy-white, legs white, tibiæ and tarsi more or less banded with fuscous. Abdomen greyish, white beneath. Forewings elongate, narrowly triangular, costa gently arched, termen oblique, hardly rounded; white, finely irrorated with fuscous, so as to appear fuscous whitish; markings fuscous; a small spot on fold close to base; a dentate outwards curved line from costa at one-fourth to innermargin at one-fourth; a short oblique double interrupted line from costa beyond middle, reaching nearly half across wing; a strongly waved submarginal line from costa at three-fourths to innermargin at three-fourths, slightly curved outwards on upper third, thence nearly straight; a dentate subterminal parallel line, straight throughout, becoming thicker above anal angle; interspace white; a row of cloudy spots along termen, obsolete above anal angle; cilia white, with two rows of blackish points. Hindwings with termen rounded; fuscous; basal two-thirds of costa broadly whitish; cilia grey, with a fuscous sub-basal line.

I have seen this species, which is not unlike *concisella*, Walk.

Standing in some collections as *polialis*, Hmp'a., but that species is referable to *Orthaga*, and is quite distinct.

Mackay, Queensland; one specimen in January.

ENDOTRICHINÆ.

Endotricha pyrocaustalis, n. sp.

Male, 24 mm. Head, palpi, antennæ, thorax, legs and abdomen orange-fuscous. Forewings elongate, moderate, costa slightly arched towards apex; termen oblique, not rounded; bright orange-ochreous; a pale yellowish strongly outwards curved line, from costa at one-third to near one-fourth of innermargin, space between this and base purplish; a fuscous discal dot; an oblique, slightly waved yellowish line, from costa at three-fourths to innermargin before anal angle; space between this and termen purplish; a row of blackish dots along termen; cilia yellowish, on basal half purplish. Hindwings with termen rounded; color, cilia and markings as in forewings; costal edge broadly yellowish, except apex.

Brisbane, Queensland; one specimen in December.

Endotricha desmotoma, n. sp.

Male, 16 mm. Head, palpi, thorax, and abdomen fuscous-purplish, middle segments of abdomen greyish. Antennæ greyish, legs whitish, fuscous tinged. Forewings elongate, triangular, costa hardly arched, termen obliquely rounded; deep reddish-purple, darkest on basal third; outer edge of basal third edged posteriorly by a broad whitish-ochreous fascia, posteriorly suffused into ground color; a fine white line from costa at five-sixths to anal angle, upper third nearly straight, thence strongly curved inwards, edged obscurely on either side with fuscous; a minute white spot on costa at three-fourths; a row of obscure blackish dots along termen; cilia ochreous, basal half blackish. Hindwings with termen waved; color, fascia and dots along termen as in forewings, but posterior edge of fascia edged by a fine black dentate line; cilia as in forewings.

Derby, Western Australia; one specimen in April.

Persicoptera chionozyga, n. sp.

Female, 16 mm. Head, palpi, antennæ, thorax, legs, and abdomen dark fuscous, somewhat purplish-tinged. Forewings elongate, triangular, costa faintly sinuate, termen obliquely rounded; dark fuscous, purplish-tinged; a straight white streak from costa at one-third to innermargin at one-third, ante-

riorly sharply defined, posteriorly somewhat suffused; a few whitish costal dots in middle; a fine white line from costa at three-fourths to innermargin at three-fourths, moderately curved outwards in middle; space beyond first line suffused with white anteriorly; space between second line and termen also suffused with white; an obscure row of fuscous spots along termen; cilia fuscous. Hindwings with termen rounded; purplish fuscous, becoming greyish on basal third; first line absent; second line, cilia, and dots along termen as in forewings.

Mackay, Queensland; one specimen in March.

TRICHOPHYSETIS CROCOPLAGA, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, and legs white, palpi fuscous at apex, antennæ fuscous beneath. Abdomen ochreous, first segment white, segmental rings whitish. Forewings elongate, moderately dilated posteriorly, costa gently arched, termen rather strongly bowed, oblique, white, with fuscous markings; a thick transverse line close to base; a rather thick double line from one-third costa to one-third innermargin, outer portion darkest; a fine double line from costa at two-thirds to innermargin at two-thirds, somewhat interrupted in middle; a moderate patch of clear orange near apex before termen; a fine line of orange along termen; cilia white, ochreous tinged at base. Hindwings with termen unevenly rounded; color, markings, and cilia as in forewings, but orange patch fuscous tinged.

Cooktown, Queensland; one specimen in January.

TRICHOPHYSETIS FULVIFUSALIS, n. sp.

Female, 18 mm. Head and palpi fuscous. Antennæ ochreous. Thorax and abdomen ochreous-whitish. Legs whitish. Forewings elongate, moderately dilated posteriorly, costa hardly arched, termen rather strongly bowed, oblique; pale ochreous-ferruginous, mixed with whitish; an outwardly oblique ferruginous streak from innermargin at one-sixth to two-thirds across wing; a similar streak, from costa at two-fifths to innermargin at two-fifths, acutely angulated just beneath costa and edged anteriorly throughout with a line of dull whitish; a curved lunate white discal mark beyond middle; a strongly and evenly outwards curved fuscous line, from costa at two-thirds to innermargin at three-fourths, edged posteriorly by a dull whitish line throughout; ground color beyond darker; a fine fuscous line along termen; cilia shining grey. Hindwings with termen rounded; color and cilia as in forewings; a

fine irregularly-waved fuscous line, from costa at one-third to innermargin at two-thirds, edged above by fuscous-ochreous shade; a similar line, slightly outwards curved in middle, from costa in middle to innermargin at four-fifths, closely edged by a posterior fuscous-ochreous shade.

Cooktown, Queensland; one specimen in March.

HYDROCAMPINÆ.

AULACODES TRIPLAGA, n. sp.

Female, 22 mm. Head, thorax, antennæ, legs, and abdomen whitish, anterior tibiæ and tarsi banded with fuscous. Palpi fuscous. Forewings elongate, posteriorly moderately dilated, costa nearly straight, termen strongly oblique; white, with pale yellow, fuscous-margined markings; a moderately thick streak along costa from base to three-fourths, extremities attenuated, emitting from its lower edge at about two-thirds an oblique streak to anal angle; a rather broad streak along termen to anal angle and there joining the oblique streak; an elongate, somewhat sickle-shaped streak on innermargin at one-third, its apex reaching more than one-fourth across wing; a golden-metallic streak before termen, beyond which the ground color is more ochreous; a row of fine black dots along termen; cilia ochreous-white. Hindwings with termen unevenly rounded; white; a narrow fuscous line from beneath costa at two-thirds to before innermargin at three-fourths, indented before termination; wing beyond the line ochreous; four black anteriorly golden-metallic edged spots on middle of termen; a short golden-metallic line beneath apex along termen; cilia as in forewings.

Mackay, Queensland; one specimen in March.

NYMPHULA DIPLOPA, n. sp.

Female, 12 mm. Head, palpi, antennæ, thorax, legs, and abdomen fuscous-whitish. Forewings elongate, moderate, costa gently arched, termen oblique; pale fuscous; markings fuscous; a small elongate subcostal spot at base; a small spot on base of innermargin; a double spot below costa at one-fourth from base; an ovate spot just below; a roundish spot just beyond middle, nearer to costa than innermargin; and two others placed respectively below, beyond, and before; a fuscous subterminal shade, only obscurely noticeable on upper third; cilia fuscous. Hindwings with termen rounded; fuscous-whitish, more whitish above and below middle; cilia as in forewings.

Broken Hill, New South Wales; one specimen in November.

PYRAUSTINÆ.

Marasmia hexagona, n. sp.

Male, 12 mm. Head, palpi, antennæ, thorax, legs, and abdomen pale brass-yellow, palpi fuscous on sides. Forewings elongate, triangular, costa hardly arched, termen oblique; pale brassy-yellow, with fuscous markings; a fine slightly outwardly curved line from one-fourth costa to one-fourth innermargin; a second from beneath costa in middle, curved outwards at commencement and slightly sinuate beneath, ending on innermargin about middle; a third from costa at three-fourths to innermargin at three-fourths, nearly straight, very slightly angulated in middle; a faint fuscous subterminal shade, curved outwards above middle; a fine line along termen; cilia whitish, with a fuscous subbasal line. Hindwings with termen rounded, faintly sinuate on posterior half; color, lines, and cilia as in forewings; subterminal shade suffused into third line.

Cooktown, Queensland; one specimen in January.

Tyspanodes metachrysialis, n. sp.

Male, 24 mm. Head, palpi, antennæ, thorax, legs, and abdomen pale yellow. Forewings elongate, triangular, costa gently arched, termen rounded, oblique; pale ochreous, basal half of wing mixed with yellowish, veins appearing to be outlined with alternate dark fuscous and whitish line; an obscure fuscous dot at base; a similar one at end of cell; cilia fuscous (imperfect). Hindwings with termen rounded; yellow; a dark fuscous band along termen, very broad at apex, becoming suddenly narrowed in middle and continued as a fine line towards anal angle; cilia yellowish.

Cooktown, Queensland; one specimen in November.

Nacoleia xanthoscota, n. sp.

Female, 20 mm. Head yellowish. Palpi, legs, and abdomen yellow-whitish, anterior tibiæ fuscous tinged. Thorax yellow, with anterior and posterior fuscous spots, patagia spotted with fuscous. Forewings elongate, triangular, costa gently arched, termen rounded, oblique; yellow, with fuscous markings; a moderate streak along costa throughout; four moderately thick waved fasciæ, first from costa at one-sixth direct to innermargin; second from costa at one-third direct to innermargin; third from costa at about two-thirds to middle of wing, thence becoming furcate and ending on innermargin about middle and anal angle respectively; fourth from three-

fourths costa to anal angle, curved outwards on lower half and meeting posterior fork of preceding streak; second, third, and fourth streaks connected along innermargin by a moderate streak; a thick streak along termen, angulated in middle so as to touch fourth streak, abruptly narrowed on lower third and connected with streak along innermargin; cilia fuscous, with a fine yellowish basal line. Hindwings with termen rounded, slightly prominent at apex; color and cilia as in forewings; markings fuscous; second line as in forewings; a moderately thick line from costa at two-thirds to innermargin at two-thirds, strongly sinuate outwards in middle and becoming very much thicker on posterior third; line along termen as in forewings, but not touching previous streak except at termination.

Brisbane, Queensland; one specimen in January.

LYGROPIA CHRYSELECTRA, n. sp.

Male, 25 mm. Head, palpi, antennæ, thorax, and abdomen orange-yellow, antennæ fuscous-tinged, abdomen with silvery-whitish segmental rings. Legs whitish, tinged with yellow. Forewings elongate, triangular, costa gently arched, termen rounded, oblique; pale yellow, with rather obscure orange markings; costal edge pale yellow, from one-third to apex, edged beneath with orange; a moderately thick waved orange line from costa before one-third to innermargin direct; a darker orange discal dot; between first line and base is another obscure similar line; a second similar line from just beneath costa at two-thirds, thence strongly curved to touch discal dot and gradually inwards curved to terminate on innermargin at two-thirds; a rather thick subterminal line, narrowest on lower one-third; cilia pale yellow. Hindwings with termen rounded; color, markings, and cilia as in forewings; discal dot absent.

Mackay, Queensland; one specimen in January.

ARCHERNIS ARGOCEPHALA, n. sp.

Male, 28 mm. Head snow-white. Palpi fuscous, beneath snow-white. Antennæ, thorax, and abdomen light brownish-ochreous. Legs snow-white, anterior tibiæ and coxæ fuscous tinged. Forewings elongate, triangular, costa moderately arched, termen oblique, slightly rounded; brownish-ochreous; a curved fuscous discal spot in middle of cell; a waved fuscous line, from costa at three-fourths, thence strongly curved outwards, thence sinuate inwards to below discal spot and ending on innermargin at two-thirds; a blackish line along costa, commencing at previous mentioned line, continued to apex, and

thence along termen to anal angle; cilia whitish-fuscous, basal half blackish. Hindwings with termen rounded; color, waved line, discal dot, and cilia as in forewings, cilia somewhat chequered with white on basal half. Underside of hindwings white, markings of upperside reproduced.

Mackay, Queensland; one specimen in February.

The white head and underside of hindwings are reliable points of distinction.

Clupeosoma (?) mimetica, n. sp.

Female, 16 mm. Head, palpi, antennæ (imperfect), thorax, legs, and abdomen pale yellow-whitish. Palpi fuscous on sides. Forewings elongate, moderately dilated posteriorly, costa hardly arched, termen oblique; pale yellowish-white; a coppery streak along basal fourth of costa, posteriorly attenuated; a moderate coppery-metallic fascia along termen, edged anteriorly by a dentate black line, and posteriorly by a pale golden-metallic line; cilia yellowish-grey. Hindwings whitish, thinly scaled; fuscous tinged around termen; cilia grey-whitish.

Derby, Western Australia; one specimen in March.

Noorda molybdis, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, legs, and abdomen, antennal pectinations 4. Forewings elongate, triangular, costa gently arched, termen obliquely rounded; fuscous; a fine blackish obscure line from three-fourths costa to three-fourths innermargin, strongly angulated outwards on lower half; an indistinct fine black curved subterminal line; cilia fuscous. Hindwings with termen rounded; whitish-fuscous; cilia light fuscous.

The type is not in good condition.

Duaringa, Queensland; one specimen in December.

Noorda metalloma, n. sp.

Female, 18 mm. Head, antennæ, thorax, abdomen, and legs yellow. Palpi dark fuscous. Forewings elongate, triangular, costa moderately arched, termen obliquely rounded; yellow; a bluish-metallic streak along costa from base to apex, posteriorly attenuated; five bluish-metallic spots on lower edge of streak, basal three smallest, between base and middle; a broad reddish-coppery-metallic fascia along termen, edged anteriorly by a fine waved, bluish metallic line, and posteriorly along termen by a fine bluish-metallic line; cilia fuscous. Hindwings with termen rounded; color, cilia, and fascia along termen as in forewings.

Very close to *calliphracta*, Turn., and may be only a geographical form.

Derby, Western Australia; one specimen in March.

Criophthona trileuca, n. sp.

Female, 12 mm. Head, antennæ, and thorax fuscous. Palpi and legs white, palpi fuscous on sides. Abdomen greyish. Forewings elongate, triangular, costa hardly arched, termen oblique; pale fuscous; three moderately thick waved dark fuscous transverse fasciæ, first from one-third costa to one-third innermargin; second from beneath costa before two-thirds to innermargin at two-thirds; third from costa at four-fifths to anal angle; a small snow-white spot near base, obscure; a well-defined similar spot on middle of first fascia; a third similar spot on middle of second fascia; a fine dentate line along termen; cilia whitish-fuscous. Hindwings with termen rounded; pale fuscous; a dark fuscous waved line from beneath costa at three-fourths to anal angle; a small fuscous mark on innermargin at two-thirds; line along termen and cilia as in forewings.

Derby, Western Australia; one specimen in November.

Metasia ectodontalis, n. sp.

Female, 16 mm. Head, palpi, antennæ, and thorax fuscous. Legs and abdomen grey-whitish. Forewings elongate, triangular, costa hardly arched, termen obliquely rounded; very dull coppery-fuscous; an obscure short fuscous mark in middle at one-third from base; a fine strongly dentate fuscous line from costa at three-fourths reaching three-fourths across wing towards anal angle, thence sinuate inwards and terminating on innermargin at three-fourths, cilia fuscous, mixed with darker fuscous. Hindwings with termen rounded; pale fuscous, mixed with greyish on basal half; markings as in forewings, but very obscure; cilia whitish, with fuscous bars.

Brisbane, Queensland; one specimen in January.

Metasia phragmatias, n. sp.

Male, 12 mm. Head, thorax, and abdomen pale ochreous, abdomen with fuscous segmental rings. Antennæ fuscous. Palpi and legs whitish, palpi on sides fuscous. Forewings elongate, triangular, costa arched towards base, faintly sinuate in middle, termen obliquely rounded; pale yellow, suffusedly irrorated with fuscous, and with fuscous markings; an irregular mark on base of innermargin; a narrow outwards curved line, from costa at about one-third to innermargin at one-

third; a moderate discal dot; a narrow line from costa at three-fourths to innermargin at two-thirds, moderately straight on upper half, thence gently curved inwards to extremity; a parallel, slightly thicker shade immediately beyond, not reaching costa; a fine waved line along termen; cilia pale yellow, with a fuscous subbasal line. Hindwings with termen rounded; color and cilia as in forewings; a nearly straight fuscous fascia from about middle of costa to middle of innermargin; a thicker dentate shade from apex to anal angle.

Mackay, Queensland; one specimen in November.

PIONEA LEUCURA, n. sp.

Female, 20 mm. Head, palpi, antennæ, and thorax light fuscous. Abdomen and legs greyish-ochreous. Forewings elongate, moderate, costa rather strongly arched, termen obliquely rounded; light brownish; a small black outwards curved line near base; an outwardly oblique blackish line from costa at one-fourth to innermargin just before middle, edged on its posterior half by a streak of snow-white, which is curved towards base, but hardly reaches it; a moderately broad snow-white transverse fascia from apex to anal angle, broad on apical portion and narrow below, with a slight sinuation below middle; a moderately broad dull reddish-ferruginous patch along termen, from below apex to anal angle, broadest below; three or four elongate costal streaks of fuscous between three-fourths and apex; a row of small black dots along termen; cilia dull reddish. Hindwings with termen rounded; pale greyish-ochreous, becoming darker on basal two-thirds, limited posteriorly by a faint fuscous waved line; a row of blackish dots along termen; cilia greyish-ochreous.

Brisbane, Queensland; one specimen in December.

PYRAUSTA EPICROCA, n. sp.

Male, 22 mm. Head, thorax, antennæ, and abdomen orange-yellow, two anterior segments of abdomen whitish. Palpi ochreous fuscous, whitish beneath. Legs white. Abdomen white beneath. Forewings elongate, triangular; costa hardly arched, termen obliquely rounded; bright orange-yellow; markings dull reddish; costal edge dull reddish-orange; first line nearly straight, from costa at one-third to innermargin at one-third; second from beneath costa at about one-half to innermargin beyond middle, with an acute projection in middle; third from costa at about three-fourths to two-thirds across wing, more or less waved and curved inwards to join second in middle; cilia greyish-fuscous. Hindwings

with termen rounded; pale yellow, paler on basal half; first and third lines faintly indicated; an orange suffused streak along termen; cilia as in forewings.

This insect stands in some collections as *extinctalis*, Chris.

Brisbane, Queensland; one specimen in January.

PYRAUSTA PETROSARCA, n. sp.

Female, 30 mm. Head, palpi, antennæ, thorax, legs, and abdomen pale fleshy-ochreous, palpi whitish at base beneath, middle and posterior legs whitish beneath. Forewings elongate, triangular, costa moderately arched, termen oblique, hardly rounded; pale fleshy-ochreous; an obscure, narrow, waved, pale fuscous line, from costa at three-fourths to innermargin in middle; cilia greyish. Hindwings with termen rounded; pale greyish-ochreous, paler on basal half; a faint fuscous median line, not appearing to reach either margin; cilia greyish.

Cooktown, Queensland; one specimen in November.

TORTRICINA.

ATYCHIADÆ.

ATYCHIA MESOCHRYSA, n. sp.

Male and female, 16 mm. Head, palpi, antennæ, thorax, legs, and abdomen blackish, hairs of palpi beneath whitish, abdomen with fine orange segmental rings. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; blackish-fuscous, with some fine obscure bluish-white scales; cilia blackish. Hindwings with termen rounded; blackish fuscous; a moderately broad bright orange fascia, from costa before middle to before middle of innermargin, but hardly reaching it; gently sinuate inwards on lower edge; cilia fuscous, terminal half orange, becoming wholly orange towards anal angle.

Distinct by the orange fascia of hindwings; the haired palpi deviate from the other described species, but I do not consider it calls for generic distinction.

Perth, Western Australia; two specimens, taken in November, received from Mr. S. Angel.

ATYCHIA EPISCOTA, n. sp.

Female, 12 mm. Head, palpi, and thorax fuscous, obscurely mixed with dull iridescent whitish, palpi beneath white. Antennæ, legs, and abdomen dark fuscous, coxæ strongly mixed with whitish, abdomen with bluish-white segmental rings.

Forewings elongate, moderate, costa nearly straight, termen obliquely rounded; dark shining fuscous; markings dull bluish-white; an elongate streak from base, above fold; a short outwardly oblique streak from one-third innermargin, reaching half across wing; an irregular patch of scales below costa at two-thirds from base; a row of scales along termen to anal angle, more or less continued along innermargin towards base; cilia fuscous. Hindwings with termen rounded; blackish; a transverse dull blue-whitish fascia from before middle of costa to before middle of innermargin, divided into three spots by dark fuscous marks, more clearly defined below; cilia fuscous. terminal half bluish-white.

Henley Beach, South Australia; one specimen in November.

TORTRICOMORPHA LEIOCHROA, n. sp.

Male, 16 mm. Head, palpi, antennæ, and thorax deep ochreous-fuscous. Abdomen and legs fuscous, anterior coxæ white. Forewings elongate, moderate, slightly dilated posteriorly, costa nearly straight, termen gently rounded; dark ochreous-fuscous; a hardly traceable transverse fuscous discal spot at two-thirds from base; cilia dark fuscous-ochreous. Hindwings with termen rounded; dark fuscous; cilia dark fuscous.

Brisbane, Queensland; one specimen in December.

TORTRICOMORPHA STILBIOTA, n. sp.

Male, 30 mm. Head and thorax deep purplish-fuscous, minutely irrorated with bluish-white scales. Palpi, antennæ, and legs ochreous, terminal joint of palpi fuscous, anterior legs bright ochreous, all tarsi orange, ringed with blackish. Forewings elongate, moderate, costa gently arched, termen oblique; deep purplish-fuscous, minutely irrorated throughout with bluish-white scales; an obscure blackish mark at one-third from base, in middle; an oblique blackish fascia from innermargin at two-thirds to posterior end of cell; a row of blackish marks along termen; cilia dark fuscous. Hindwings with termen rounded; dark smoky-fuscous; cilia greyish; black on basal half.

Duaringa, Queensland; one specimen in January.

TORTRICOMORPHA LICHNEOPA, n. sp.

Male, 16 mm. Head, palpi, and thorax whitish-fuscous, greenish tinged, palpi white beneath with a fuscous ring at apex of second joint. Legs white. Antennæ ochreous. Abdomen fuscous, segmental margins greyish. Forewings rather

short, costa rather strongly arched, termen obliquely rounded; whitish-fuscous, mixed with dull greenish; a rather broad black outwardly oblique fascia from one-third costa to three-fourths across wing; a fine black dentate line, from costa at two-fifths to innermargin at one-third, strongly angulated outwards in middle; a narrow black streak from costa just before three-fourths to halfway across wing, thence continued as a suffused fascia to anal angle; a dentate line along termen; cilia greenish-fuscous. Hindwings with termen rounded; black, thinly scaled; cilia whitish, base blackish.

Cooktown, Queensland; one specimen in December.

TORTRICOMORPHA MONODESMA, n. sp.

Male, 20 mm. Head, palpi, antennæ, and thorax dark ochreous-fuscous. Abdomen fuscous, whitish beneath. Legs whitish, fuscous tinged. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; dark ochreous fuscous; a nearly straight snow-white line from costa at three-fifths to innermargin at two-thirds; cilia fuscous. Hindwings with termen,, sinuate in middle; black; cilia fuscous-whitish.

Mackay, Queensland; one specimen in December.

TINEINA.

XYLORYCTIDÆ.

CRYPTOPHAGA GYPSOMERA, n. sp.

Male, 52 mm. Head, palpi, antennæ, legs, and thorax white, faintly ochreous-tinged, antennal pectinations 4, ochreous. Abdomen fuscous, white beneath, segmental margins white, second segment dull red. Forewings elongate, moderate, hardly dilated posteriorly, costa slightly arched, termen oblique; white, faintly ochreous-tinged, especially along termen; cilia snow-white. Hindwings with termen rounded, faintly sinuate before anal angle; fuscous; costal edge and termen to middle broadly snow-white; cilia as in forewings.

Closely allied to *albicosta*, Lew., but the total absence of markings of forewings are sufficient grounds for separating it from that species. The former species varies, but not to any extraordinary extent.

Bairnsdale, Victoria; one specimen in January.

GELECHIADÆ.

YPSOLOPHUS LYGROPA, n. sp.

Female, 10 mm. Head, palpi, and antennæ dull ochreous-grey, palpi fuscous on sides and beneath. Legs and abdomen

blackish, posterior tibiæ and tarsi grey. Forewings elongate, rather narrow, costa gently arched, termen obliquely rounded; dull ochreous-greenish; costa more or less strigulated throughout with blackish; markings blackish; a dot in middle at one-fourth from base, a second before middle, third beyond, the three forming a longitudinal series and more or less edged with a white dot; a fourth dot below and between second and third; an obscure row of dots along termen and apical fourth of costa; cilia fuscous, with a blackish median line. Hindwings with termen emarginate, apex somewhat produced; blackish; cilia greyish-fuscous.

Wayville, South Australia; one specimen bred from *Eucalyptus sp.* in March.

TINEIDÆ.

Lepidoscia melanogramma, n. sp.

Female, 18 mm. Head ochreous-orange. Thorax, antennæ, and legs dark fuscous, posterior legs ochreous. Abdomen greyish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 absent; light ochreous-yellow, with blackish markings; a thick basal streak; a moderately straight fascia, from costa before middle to innermargin before middle, constricted above innermargin; a thick subcostal bar uniting basal and first fasciæ, and enclosing a small spot of ground color on costa at one-sixth; a thick fascia from costa at three-fourths to anal angle, strongly curved outwards on lower half, and almost enclosing a small spot of ground color on anterior edge; a small discal spot above middle; a wedge-shaped spot from apex to middle of last fascia, abruptly narrowed on lower half; two small spots on middle of termen; cilia ochreous, with a broad blackish bar at apex. Hindwings thinly scaled; pale fuscous; 6 and 7 almost from a point; cilia ochreous.

Stawell, Victoria; one specimen in July.

Amongst the described species it appears to come nearest *tyrorantha*, Meyr., but differs apart from the different position of markings of the forewings by the light fuscous hindwings.

Xysmatodoma retinochra, n. sp.

Male, 14 mm. Head ochreous, palpi ochreous. Thorax dark fuscous. Antennæ and abdomen grey, legs fuscous, posterior pair greyish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 absent; pale ochreous, with dull purplish-black markings; a narrow irregular streak along costa to one-sixth, at base extended to inner-

margin, an irregular spot on innermargin at one-fourth, reaching one-third across wing; an outwardly oblique fascia from about one-third costa to four-fifths innermargin, dilated on lower and with a sinuation above middle; a irregular fascia from three-fourths costa to anal angle, tolerably well defined on upper half, more or less broken into spots on lower half; disc between fasciæ finely strigulated on upper half; a moderate patch of strigulæ at apex, more or less reaching anal angle and joining second fascia; cilia pale ochreous. Hindwings thinly scaled; pale fuscous; cilia fuscous.

One specimen from Hobart, Tasmania in September.

Not unlike the following, but differs by the ochreous ground color of forewings.

XYSMATODOMA MICROZONA, n. sp.

Male, 16 mm. Head ochreous, palpi, and antennæ fuscous. Thorax dark fuscous, with a whitish anterior spot. Abdomen and legs fuscous, posterior legs greyish-ochreous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 absent; white, with blackish markings, and irregularly strewn with small blackish spots, hardly forming strigulæ; costa spotted with blackish, one just before and one beyond middle larger, first followed beneath by a similar one; a short thick, hardly oblique streak from costa before three-fourths, reaching nearly half across wing; a narrow somewhat interrupted transverse fascia, from costa before apex to anal angle, most distinct on margin; a suffused spot on innermargin in middle, and indications of a second at one-third; cilia whitish. Hindwings pale fuscous; cilia fuscous-whitish.

Semaphore, South Australia; one specimen in December.

Somewhat allied to *cataphracta*, Meyr., but the absence of complete fasciæ and ochreous head separate it from that species.

XYSMATODOMA HEMICALYPTRA, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, abdomen, and legs dark fuscous, antennal ciliations over 1; posterior legs ochreous, abdomen beneath yellowish. Forewings elongate, moderate, costa gently arched, termen very obliquely rounded; 7 absent; dark fuscous, obscurely spotted and strigulated with darker; spots towards apical portion of wings more clearly defined; a row of dark fuscous spots along termen and apical portion of wing; cilia dark fuscous. Hindwings pale yellowish, with suffused blackish band along termen, broadest at apex; base of wing and innermargin fuscous; cilia as in forewings.

Hoyleton, South Australia; one specimen in September.

Not very near any other species known to me.

Xysmatodoma holozona, n. sp.

Male, 18 mm. Head orange. Palpi, antennæ, thorax, and abdomen purplish black, anal tuft orange. Legs dark fuscous, posterior pair dull ochreous. Forewings elongate, moderate, costa hardly arched, termen gently rounded, oblique; 7 absent; ochreous-yellow, with well defined purple blackish markings; a rather broad basal fascia, outer edge slightly oblique inwards; a nearly straight moderately thick fascia, from costa in middle to middle of innermargin, slightly narrower on innermargin; a much broader fascia, from costa at five-sixths to anal angle, much broader on upper half and containing a roundish spot of ground color on costa near anterior edge; a narrow streak along termen, reaching extremity of last fascia; cilia ochreous, fuscous at base. Hindwings bright orange yellow; basal and innermarginal hairs blackish; a fine black line along termen, continued to apex, where it forms a small patch; cilia blackish.

Balaclava, South Australia; one specimen in September.

Allied to *carlotta*, Meyr., but widely distinct.

Iphierga crypsilopha, n. sp.

Male, 12-18 mm. Head and palpi dull orange, palpi slightly tufted. Antennæ and legs greyish-ochreous. Thorax dark fuscous. Abdomen greyish. Forewings elongate, moderate, costa hardly arched, termen strongly rounded; 4 absent; pale greyish-ochreous; markings ill-defined; fuscous; a moderate basal fascia; four moderate spots on costa at one-third, just beyond middle, four-fifths and five-sixths, each indicating commencement of slender fasciæ, of which the first and second only are just traceable, the others appear as fine dots or obscure strigulæ; a moderate spot on innermargin just before anal angle; some obscure fuscous dots along termen; cilia greyish-ochreous. Hindwings pale greyish; cilia greyish, ochreous at base.

Mackay, Queensland; three specimens in November and December.

Closely allied to *pentulias*, Meyr., of which it may prove to be a variety, but the absence of any prominent tuft on the palpi, which is a special character of that species, the greyish-ochreous legs, which in *pentulias* are dark fuscous, and the interrupted fasciæ of forewings seem to favor it being distinct.

The female is probably apterous, as in *Talaporia* (a European genus).

SCARDIA PORPHYREA, n. sp.

Male, 20 mm. Head dull ochreous, spotted with fuscous. Palpi ochreous-fuscous, second joint mixed with fuscous, strongly tufted, terminal joint obtuse, ochreous, with subbasal and subapical blackish rings. Thorax brownish, mixed with ochreous-whitish. Abdomen and antennæ dark fuscous, abdominal segments ochreous. Legs ochreous-fuscous, tibiæ more or less ringed with whitish. Forewings elongate, moderate, costa moderately arched, termen obliquely rounded; 7 to apex, 4 present, 8 and 9 stalked; dark bronzy-fuscous, with numerous closely arranged dark fuscous and whitish dots and strigulæ; a streak along fold and veins towards termen more or less marked with metallic lilac; costa strigulated with alternate ochreous and fuscous spots, at one-fourth and beyond two-thirds the spots are larger and quadrate; an irregularly quadrate spot on innermargin in middle reaching half across wing; a spot on costa before apex, more or less continued to middle of termen; cilia fuscous, somewhat barred with ochreous. Hindwings shining purplish-fuscous; cilia greyish-ochreous, with a fuscous subbasal line.

North Queensland (Cooktown probably); one specimen in April.

Nearest *clonodes*, Meyr., but apart from the structural difference, it may be known by the lilac-metallic streaks, which though obscure are noticeable. The termination of vein 7 at apex may be an accidental deformity confined to the individual under notice.

Further Notes on the Geology of Kangaroo Island.

By Walter Howchin, F.G.S.

[Read April 7, 1903.]

A second visit to Kangaroo Island enables me to offer some remarks on the Geology of the Island supplementary to those read before the Society in July, 1899. The observations now submitted chiefly concern—

(*a*) Further evidences of Pre-Tertiary glacial remains.
(*b*) Brief reference to the older rocks, including the granite of Cape Willoughby and two igneous intrusions.
(*c*) The occurrence of fragments of asphaltum and fossil resin on the south coast.
(*d*) Evidences of occupation of the Island by an aboriginal population.

Pre-Tertiary Glacial Remains.

In my former paper (Trans. and Proc. Roy. Soc., S.A., vol. XXIII., p. 198) the glacial till and associated erratics were described as covering a great part of the north-eastern peninsula of the Island. These remains were traced around Point Marsden and westward to Smith Bay; and inland, skirting both the north and south sides of the Gap Hills, with extension southwards. Further evidences of this extinct ice field have now been observed near Queenscliffe, Point Morrison, Hog Bay, and Antechamber Bay, along the eastern coast line of the Island.

Queenscliffe.—In revisiting this locality I have been able to confirm my first impressions by securing indisputable proofs of the occurrence of the "till" in the neighbourhood, and also of the inferior position which the glacial beds occupy with regard to the Eocene limestone which forms the sea cliffs.

The Eocene beds lie in eroded hollows of the glacial clay. This can be well seen at Beares Point, a little north of the jetty, where the Eocene limestone ends almost abruptly, abutting against the glacial clay which rises from beneath. Following the coast on the north side of the jetty the glacial beds exhibit a very uneven line of junction with the overlying beds, sometimes outcropping about sea level, and at others rising many feet above their level in the cliffs. In one of these swellings of the clay I obtained a very strongly glaciated erratic, a foot in length, which

was firmly set in the clay at a height of about 15 feet above high water mark. The glacial clay is covered, unconformably with a white, rather coarse sand and ironstone, averaging about 20 feet in thickness, and the latter is covered, in an eroded hollow of about 100 yards wide, with a thick basaltic flow, which forms the cappings of the principal heights in the vicinity. The order of succession is, therefore, as follows:—

Basaltic sheet	... about 100 feet
White sand and ironstone	... " 20 "
Eocene limestone ...	... " 15 "
Glacial clay	(depth not proved)

On the south side of the Queenscliffe Jetty the Eocene beds form the sea cliffs for about a mile, showing a very decided dip to the south-east. Near the most southerly outcrop of these beds the rock is characterised chiefly by the remains of Echini, which occur in immense numbers. *Cassidulus longianus* is extremely common. *Echinolampus posterocrassus* and *Eupatagus coranguinum* are also fairly common. At one horizon the rock for about a foot in thickness is exclusively composed of closely packed remains of *Fibularia gregata*. The waste of the sea cliffs has liberated the Echini, which can be picked up in great numbers from amongst the shingle of the beach. A little further south the Eocene beds have disappeared in consequence of a plane of marine denudation having been cut by the sea along the line of parting of the glacial clay and the tertiary limestone. Fragments of the latter, in situ, can be seen as a thin covering on the exposed boulder clay between tide marks.

The coast road going south-west crosses the Cygnet River about two miles from the township. On passing down the hill leading to the flats bordering the Cygnet River, numerous erratics were noticed on cultivated clay land on the eastern side of the road. Several varieties of granite were noticed, some showing the same kind of opalescent quartz which was subsequently recognised as a pretty constant feature of the granite of Cape Willoughby. Other erratics composed of a siliceous quartzite, &c., were also recognised. The largest ice-borne stone observed at this spot measured about two feet in its longer axis.

After leaving the Cygnet Valley no further evidence of glacial deposits were observed in a journey south-westerly, by Hawk's Nest and the Brecknell Sandhills. The country in this direction, with the exception of a low ridge of palæozoic rocks, is thickly covered with recent and pleistocene deposits, which effectually mask the older geological features.

Nepean Bay and Point Morrison.—The occurrence of glacial clay underlying the Eocene beds have already been described at

Queenscliffe and for some distance south of the township along the beach. Near the head of Nepean Bay high clay banks occur, known as the "Red Cliffs." These could be distinctly seen from Queenscliffe, and are probably of glacial origin, but I had not the opportunity of examining them.

Point Morrison forms the bold headland on the eastern side of Nepean Bay. The beach is occupied by rough outcrops of a dark-colored quartzite, somewhat micaceous in places. The beds are either vertical or slightly divergent, exhibiting acute anticlines. Observations were limited to the short interval during which the steamer took in cargo. A granite boulder of small size was found on the beach, and the rich clay soil of the local homestead, owned by Mr. Thomas, indicate the presence of the glacial beds. Mr. Thomas informed me that in Newland Bay, two miles eastward of Point Morrison, some large granite boulders occurred on the beach.

Hog Bay.—The largest patch of good arable land on Kangaroo Island occurs at Hog Bay, and owes its origin to the outcrop of glacial clay. The coast is extremely rocky, and in most cases the rocks face the sea in bold, precipitous, and often inaccessible cliffs. Two small bays near the township afford safe landing places.

Glacial erratics are very numerous around Hog Bay. The smaller ones can still be seen on the ploughed ground, and the larger ones are generally either heaped in the field or drawn aside to the fence. They consist chiefly of granite, gneiss, or quartzite. A granite boulder, measuring three feet six inches by two feet six inches, has been drawn, with others, from Mr. Buick's paddock into the creek on the west side of the cultivated ground.

The agricultural ground between Hog Bay and Kangaroo Head affords many examples. A dark-colored laminated quartzite, too large for removal, was noticed in one field on the east side of the Head. It has split into two fragments, each one being about three feet in length. The soil generally in these fields is of a very stony nature from the number of erratics contained in the clay. Some of the larger blocks have been apparently artificially broken. One of these, a granite split into two large and a number of smaller pieces, must originally have measured five feet by two feet.

A small bay on the east side of Kangaroo Head proved to be specially interesting. Resting on old schistose rocks and a beach of sticky clay were seen a great number of very large erratics. The largest, a great gneissic block, measured six feet long by four and a-half feet broad and four feet high, with another block of the same kind of rock, of almost equal size, close to it, which

no doubt formerly formed one mass with its neighbor. Standing by this great boulder I counted eight other large granite and gneissic boulders on the beach within easy sight. Two boulders, showing a close resemblance to the granite of Cape Willoughby, measured respectively four feet, and four feet nine inches, in their longer axes. This bay is backed by sloping clay banks and cultivated fields. The clay near the coast has been somewhat rearranged by slips and rainwash, but it is very stony, and fair-sized erratics can be seen in the higher cultivated ground.

A few erratics can also be seen by the side of the road in the township of Hog Bay, near the top of the cliffs, but the most striking assemblage of these travelled stones is found within the limits of the small inlet of the sea known as Christmas Cove, or the "boat harbour." Here the glacial clay slopes down to the beach, and within tide marks as well as standing out of the water, below low water line, a very great number of glacial erratics can be seen, ranging from small pebbles up to many tons in weight. Only a few of them can be referred to.

(No. 1.) Near the head of the cove three very large granite blocks lying close together, near high water mark, immediately attract the notice of the visitor. The three pieces have evidently formed one mass, which has split along joint planes and fallen asunder. The measurements of the respective fragments are as under:—

	Feet long.	Feet broad.	Feet high.
(*a*) A long shaft-like mass, prostrate	9	4	2
(*b*) Of pyramidal shape	4½	3	3½
(*c*) Roughly pyramidal	5¾	3½	3¼

(No. 2.) Near this group, but at a lower level, is a large dark-colored siliceous quartzite, quite distinct from the local rocks, which measures 5 feet 9 inches long, 5 feet broad, and 2 feet 9 inches in height.

(No. 3.) On the east side of the cove another boulder of granite attracts the eye by its huge size and very coarsely porphyritic structure. Numerous crystals of orthoclase fully two inches in length occur throughout the mass. It has also suffered fracture along a joint plane. Measurements, 8 feet by 5 feet 6 inches, by 4 feet 6 inches.

(No. 4.) On the west side of the cove a large boulder of granite, finer in texture than the one last described, is left dry on the retreat of the tide. Like most of the granites in the cove, it is of a pinkish color, and measures 6 feet 3 inches by 4 feet 3 inches by 2 feet 6 inches. There are several other examples within the cove which nearly, if not quite, equal the proportions of those described, whilst the stony beach as a whole has gathered most of its material from the glacial clay which forms its banks.

Following the trend of the coast, on the east side of Hog Bay the cultivated land continues to show many erratics, some of considerable size, up to the level of the inland plateau, estimated at about 300 feet above sea level. The larger stones can be seen mostly along the fences or near the waterholes.

Antechamber Bay.—The coast between Hog Bay and Antechamber Bay presents the features of lofty and precipitous cliffs, which rarely give access to the sea, the waves for the most part breaking against the base of the cliffs, with no beach space. Within four miles of Cape Willoughby, however, there is a notable break in the continuity of the cliffs at Antechamber Bay, with sandhills for several miles in extent. Towards the south-east portion of the bay a group of erratics can be seen between tide marks. Seven granite boulders were counted; the largest measured 7 feet by 4 feet 9 inches by 4 feet high, and another 6 feet by 3 feet 6 inches.

The journey between Hog Bay and Cape Willoughby was made by road through dense scrub, which afforded but slight opportunities for making geological observations, more particularly as the surface was generally occupied by comparatively recent deposits of sand and yellowish clay. It is highly probable that the glacial clay underlies some of these superficial deposits, and in places may be so near the surface that deep ploughing might bring it within reach of cultivation.

The observations now submitted cover the coastal districts for thirty miles in direct line between Queenscliffe and the southern end of Antechamber Bay, and shews that the great Pre-Tertiary icefield included the eastern side of Kangaroo Island. The great number of granite and gneissic boulders which occur in the till indicate that the centre of dispersion was in the great granitic region which lies to the south of the continent, and which is now, with the exception of a few isolated headlands and islands, submerged in the Southern Ocean. To produce ice sufficient for the transport of the enormous amount of morainic matter which is spread over many thousands of square miles of land and sea requires that these granitic highlands which formed the snowfields in Pre-Tertiary times should have been of considerable elevation and extent. Travelling ice must have done much towards the removal of this lost mountain range, but what the ice did not complete has been most effectively done by the sea, which has reduced the former high lands to a submerged continental shelf fringing the southern shores of Australia, and from which Tasmania and other islands still raise their heads above the water line. In tracking the path of the ice agents, by means of their "spoor," back to the south-eastern portions of Kangaroo

Island, we have probably reached the extreme southern limits of our observations in the direction of their source. Beyond this point the sea shrouds the rest in its eternal mysteries.

General Geological Notes.

Observations on the geology of Kangaroo Island have been published by the French navigator and explorer, Peron ;* the late Professor Ralph Tate,† Mr. H. Y. L. Brown‡ (Government Geologist), and the present writer.§ Whilst the principal object of my late visit to the Island had reference to the occurrence of glacial evidences, a few general observations were made, and I take the present opportunity of placing them on record.

Archæan or Palæozoic.

On the southern side of the Cygnet River the land rises to a low ridge, which forms the geological axis and watershed of the Island. This elevated land shows an exposure of older Palæozoic rocks, consisting of soft, easily decomposed flaggy quartzites, somewhat rarely interbedded with clay slates. The beds have an E.N.E. and W.S.W. strike, the latter being very persistent in direction, so far as my observations extended on the Island. The older rocks, which form the geological axis of the Mount Lofty Ranges, gradually curve westerly as they approach Cape Jervis, whilst the strike slowly changes from approximately north and south to a direction more nearly east and west. This occidentation of the strike is still further accentuated on Kangaroo Island, the geology of which must be regarded in its main axis as simply a continuation of the ranges which constitute the physiographical backbone of South Australia.

On both sides of this quartzose range, and on its lower slopes, the subsoil is a yellowish clay, usually covered with a few inches of loose sand and small ironstone gravel.

The south side of the Island is included within the highly metamorphic zone which is characteristic of the eastern side of the Mount Lofty Ranges, the rocks of which follow a similar westerly curve as the less altered beds already described. This metamorphic belt takes in the bed rocks of the Murray Plains, the coast line of Port Elliot, Port Victor, and the principal headlands on the south side of Kangaroo Island. It is to the existence of these granite headlands that Kangaroo Island owes its preservation from complete marine denudation. Unfortunately, great thicknesses of recent deposits overlie these plutonic rocks along

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*Voyage de Découvertes aux Terres Australes.
†Trans Roy. Soc., S.A., v. VI., p 116.
‡Report, Dec. 13, 1898.
§Loc. cit. ante.

the south coast and obscure their outcrops, limiting their study, for the most part, to small, isolated inliers.

The only granitic outcrop that I had the opportunity of visiting was at Cape Willoughby. The Cape is a bold granite foreland at the eastern extremity of Kangaroo Island. Its high cliffs, broken masses, and deep clefts present a scene of rugged grandeur, especially when the storms of the Southern Ocean try their full force on these weather-beaten rocks. The granite consists of pink-colored orthoclase, opalescent quartz, and pockets of biotite. The rock splits up along joint planes, and is everywhere undergoing disintegration by spheroidal exfoliation, producing enormous hemispherical or subglobular masses. Near the extreme point of the Cape a large intrusive mass of fine-grained aplite takes the place of the granite, and exhibits numerous reticulated veins penetrating the granite. The line of junction between the granite and aplitic intrusion is very sharp and well defined, and as the latter has not weathered to such a degree as the granite, the veins stand up as low ridges above the granitic surface. The granite occupies about three miles of coast line, but I had not the opportunity of visiting the points of junction between the granite and the schistose rocks of the district.

Granite boulders were noticed at some distance inland from the Cape, but with the granite outcrops so near it would be a doubtful matter to refer such scattered granite stones in their present position to the agency of ice. The exposed granite surface was carefully examined for ice marks, but its weathered condition and comparatively rapid exfoliation precluded the possibility of such markings having survived so great an interval of time, except where specially protected. I was, however, struck with the rounded and *roche moutonnée* contour of the granite, as it sloped away from the cliffs, and it is quite possible that the larger features of the surface may still retain the outline given to it by the moving ice.

The sea beach, on both sides of the headland, exhibits a wonderful assemblage of large, rounded granite boulders, worn by wave action into spherical or subspherical masses piled on each other, and rendering the beach almost impassable to pedestrians.

At Hog Bay the bed rock is a fine-grained biotite schist, sometimes passing into a more siliceous stone, standing at a high angle of dip which varies from 45° to 80° S.E. The whole of the schistose series gives evidence of the great strain it has undergone in the process of folding, not only in the numerous instances of local contortion, but also by the great number and extent of the quartz veins which run in every direction, and often develop into bunches. The quartz is often tinged with a

ruddy hue or is smoky. These micaceous beds constitute a large proportion of the palæozoic rocks of the Island, and can be followed along the slopes of the surrounding hills and far inland.

In Christmas Cove (Boat Harbour), and following the beach for a considerable distance in a westerly direction, is a very remarkable conglomerate bed. It differs from the most of beds of this character in that the stones, which range upwards in size to ten or twelve inches, being set without arrangement in a matrix of fine deposit. The ground mass is finely micaceous, flakey, and with its included pebbles, greatly sheared. Professor Tate, in the article already referred to, mentions this bed, and states that the included pebbles were angular and subangular. So far as my observation went the pebbles were uniformly rounded and consisted mainly of quartz, quartzites, and granites, many of them fractured or sheared under pressure. On the west side of the township a series of these conglomerate beds occur close together, having an aggregate thickness of about 27 feet. About the centre of the series is a well-defined bed, three to four feet in thickness, which although schistose when split, has the appearance of having been laid down as an unstratified deposit. In some respects it has the appearance of a glacial bed, and presents many points of resemblance to the supposed old palæozoic till bed of the mainland, as it occurs in the metamorphosed area of Barossa, Balhannah, and Inman Valley.

Igneous Dykes.

About the centre of Antechamber Bay the sea cliffs are composed of the locally characteristic dark-colored, fine-grained mica schists, having a strike E.N.E. and W.S.W., dipping southerly, at 80°. Above this rocky cliff Mr. Nathaniel Simpson has his homestead, which is built upon an igneous dyke that runs somewhat irregularly east and west for nearly a mile in length, but is not always apparent at the surface. Although within less than a hundred paces from the sea cliff, the dyke is not seen in the face of the cliff, having evidently died out in this short distance. It has the features of a close-grained diabase (aphanite), but has not received petrological examination. Some of the contact rock (which is normally a fine-grained biotite schist) is converted into amphibole schist, with the structure of "tadpole" rock.

Mr. H. Y. L. Brown (Report, 1898) mentions a dolerite dyke as occurring at Cuttle Fish Bay, which I was unable to visit, but at the homestead of Mr. Tretheway, a little to the north of Cuttle Fish Bay, there is a considerable exposure of an igneous neck or dyke, in the form of a knoll. The rock is very fine grained, carrying gas cavities. The amygdaloids filling these cavities are about the size of pins' heads, or a little larger, and are formed of

some ferruginous mineral which easily decomposes, leaving behind a reddish stain.

Gem Stones.

Whilst at Queenstown, Mr. Cox, of Antechamber Bay, brought over a number of stones for my inspection which he had collected on the Island. Amongst these were a few green and pink (rubellite) varieties of tourmaline, transparent, of good quality and likely to be of value as gems. Some of the specimens shown me contained the precious tourmaline in a granitic matrix. I regretted that my arrangements would not permit my visiting the spot where they had been obtained

Tertiary (Eocene).

A very limited but interesting outlier of Eocene limestone occurs at Cape Willoughby, near the lighthouse, exhibiting a cliff face towards the sea The beds are about 15 to 20 feet in thickness, resting unconformably on the granite. Immense boulders of granite, as well as smaller ones, are included within the Eocene beds, showing that the promontory was under the influence of marine denudation as far back as the Lower Tertiary. These beds are sparingly fossiliferous, and have been greatly leached. The lime thus extracted has been redeposited near its source, forming a surface layer of travertine on much of the ground which forms the landward slopes.

Post-Tertiary and Recent.

On the south side of the watershed in the main portion of the Island, numerous lagoons, varying from fresh to salt, are a marked feature. Murray's Lagoon, situated a little west of Hawk's Nest, is one of the largest of these. It measures three miles by two miles in extent, and has generally been sufficiently fresh to be used for stock, but at the time of my visit it was at its lowest known level, being sufficiently dry to permit us walking into the centre. What appeared from a distance to be a number of large stones lying near the centre of the lake, proved on examination to be masses of tufaceous limestone, a foot or two high. These accretions, which had evidently been formed in the lake waters, consisted largely of brackish water gastropods and the carapaces of entomostraca, cemented together by carbonate of lime and other mineral matter. It is evident that the lagoon has been at one time much larger than its present margins would indicate, as a marly limestone, thickly studded with the lake faunæ, occupies the surrounding rises, including the knoll on which the Hawks Nest Homestead, occupied by Mr. A. J. Florance, is built, at a mile distance from the present edge of the lagoon. Similar fossiliferous marls were

The recent elevation of the land on the eastern side of the Island has materially affected the contour of Antechamber Bay. At the head of the bay Chapman's River marks the site of what was once an arm of the sea or estuary running much further into the land than at present, its former outline being indicated by raised sea beaches, lagoons, marsh, and sandhills.

Asphaltum and Fossil Resins.

The occurrence of a pitch-like substance along the southern shores of Kangaroo Island has attracted attention for many years and awakened hopes of finding mineral oil in the locality that has led at various times to trial bores being sunk. Mr. Tolmer, in his "Reminiscences," says that as far back as about 1844 he found loose fragments of pitch at several points on the south coast, aud 20 years later he was shown the spot where the substance exuded from the rocks. Professor Ralph Tate visited the site of one of these trial bores, and from the enquiries instituted by him, expressed the opinion without any reservation that these carbonaceous products were nothing more than "waifs" of the shore. The Government Geologist, Mr. H. Y. L. Brown, in examining portions of the coast line where the substance had been obtained (South-West River and Hog Bay River) was led to the same conclusion.

Near the close of last year a report was current in Adelaide that the material was found inland, at a considerable elevation above sea level, and could be seen in situ, which awakened fresh interest in the matter, and induced the writer to undertake a journey to the locality to test the value of these new assertions. With regard to the main object of my visit, the results were disappointing, but at the same time I cannot claim that they were absolutely conclusive.

The materials which created the hope of finding mineral oil in the vicinity are of two kinds—

(*a*) A kind of *asphaltum*, usually occurring in more or less flat cakes, up to three or four inches in thickness, or in small broken fragments.

(*b*) *Dark-colored travertine limestone*, brown to black, either as angular fragments, or similarly dark-colored limestone crust. The black coloring of the stone was supposed to arise from the infiltration of bituminous matter.

My observations included the following points :—

1. The asphaltum occurs in blown sand, or on surfaces lately denuded of sand by the wind. On the east side of the bay I picked up a fragment about six inches in diameter and subglobular in form. On the west side of the bay, in a sand cliff about

effects of the wind. The wind works around the hardened crust until it scoops out a conical hill 30 or 50 feet high, as in the case of one very conspicuous height of this kind amongst the Brecknells, known as the "Pyramid." We struck the coast at an unnamed but interesting bay about four miles east of Nobby's Island. The headlands of this bay are bold and extremely rough, especially those on the west side, which rise to a height of 100 feet, and gradually slope towards the point. The headlands are entirely composed of recent or pleistocene deposits. Successive layers of travertine limestone, interbedded with more or less indurated blown sands, are exposed in the face of the cliffs, the weathering of the sand-rock showing very strikingly the lines of oblique lamination arising from its mode of origin.

Near the extremity of the western headland, only accessible at low water, is a natural arch cut out by the sea about 20 feet in height, with an eagle's nest occupying the top near the centre of the arch. Passing under the arch, access was gained to a very secluded cove, in which the structure of these ærial deposits exhibited some remarkable and instructive features. There are few places, if any, in the world where sand dunes occur in such magnitude, or could be more effectively studied, than along the south coast of Kangaroo Island.

The existence of such an enormous amount of sea-worn sand raises the question of its origin. The present limited coast line of Kangaroo Island seems disproportionate and inadequate for the accumulation of such a vast amount of waste material. Many things point to the former existence of a great mountain range to the south of the continent, as already suggested, and which is now represented only by the granitic zone on the southern seaboard, which is to a great extent submerged. The south coast of Kangaroo Island would be on the northern flanks of this lost mountain range, and it is possible that the extensive accumulations of sand along the south coast may be the remains of the waste of what was once the main watershed of the southern portions of South Australia.

The great thickness of the recent and pleistocene beds entirely obscures the palæozoic rocks of the country traversed, but beach pebbles of the softish palæozoic quartzite, already described as outcropping inland, suggests the close proximity of this rock.

A black flint with white coating, very characteristic of the Eocene limestones of the south-east of the State, was picked up on the beach within the bay, which may have been derived from beds of this age not far distant.

Evidences of a raised sea beach were obtained at the Breck, nells, on the south coast, where a white travertine limestone thickly studded with marine shells, occurred in slabs a few feet above high-water mark.

character; (*b*) sharp, clean fractures; (*c*) its occurrence in loose sand; (*d*) absence of any local geological evidence of rocks of this type.

2. The evidence, so far as it goes, points in the direction that these fragments have been introduced into the locality in comparatively recent times. Recently formed surface limestone and sand rock are extensively developed in the neighborhood, and rise into cliffs one hundred feet high. These rocks in consolidating have caught up into their mass whatever surface material may have been at hand. Had the bituminous matter originated in the locality it seems highly probable that some evidence of its occurrence would have been shown in these recent superficial beds. Although carefully looked for, not a vestige of such could be found. The inference is that the bituminous material has been introduced into the locality subsequently to the formation of these recently consolidated beds, or that it exists locally in very limited quantities.

In conclusion, three explanations may be considered in accounting for this occurrence over so great a length of seaboard.

1. That the bituminous material has been derived from a *natural* bed locally developed. Whilst not impossible such a view we regard as highly improbable. No visible rock in the district is at all likely to produce bituminous material, which can only be derived from the decomposition of organic matter, the existence of which in the local rocks there is not the slightest evidence. If it has a natural and local origin it is almost certainly sub-marine, and most likely of Tertiary age. Beds of this age have been already referred to as outcropping on the Island, but in both the localities mentioned their base is exposed, the one resting on glacial clay, and the other on granite, without the slightest indication of bituminous material. Moreover, had the asphaltum oozed out beneath the sea the material would certainly have become mixed with a good deal of foreign matter, whilst the specimens found are very uniform and pure.

It is worth remarking that in Cuba submarine beds of asphaltum are worked at four different localities. The beds are contained in rocks of Lower Eocene age, and have been mined in water from 80 to 125 feet in depth for the past 25 years. One of these deposits, situated in Cardenas Bay, is of unusual richness, and is described in its appearance as resembling cannel coal with a more brilliant lustre. Whilst the geological evidence is decidedly unfavorable, the peculiar conditions under which mineral oil is sometimes found imposes on us a measure of caution in affirming that it is impossible to occur on our shores as a natural product.

2. The *agency of man.* In the days of wooden vessels pitch was always carried on board as an essential article for repairs, &c., and would no doubt be often lost at sea from various causes, just as stray pieces of coal are washed up at intervals all along the coast; its low specific gravity being favorable to its wide distribution. Its occurrence inland can be explained by the old sealers and whalers carrying it inland to their homes, and from its friable nature dropping small pieces by the way. It may be doubted, however, whether such an explanation satisfies all the facts of the case.

(3) A third explanation may be sought in the fragments being sea borne and far travelled. This supposition gathers weight from the considerations that the material has an odour and pliability which distinguishes it from the commercial article; whilst its wide distribution, including the entire southern sea board of South Australia, is difficult to explain on the grounds either of local origin or loss at sea. So extensive an occurrence requires a distributing agent operating on a grand scale, such as ocean currents. A point of considerable interest in this view of the subject is the association of lumps of fossil resin with the bituminous material, the two classes of substances occurring in the same localities and under the same conditions of distribution. There is a high probability that they have been transported from a common source. The erosion of river banks, or the operation of waves on cliffs, in which these substances are contained, would set them free; and on account of their low specific gravity would be easily floated and carried to great distances when brought within the influence of oceanic currents. The great antarctic outflow towards lower latitudes impinges on the southern shores of Australia, and follows an easterly direction through Bass Strait and southern coast of Tasmania to New Zealand. This precludes the idea that the bituminous and resinous minerals have travelled hence from New Zealand. The trend of the oceanic drift which reaches our southern shores takes in Kerguelen and other islands of the southern sea in its course, and it may be found that these waifs of the sea may have had their origin in these distant islands. In Kerguelen poor seams of coal are known to exist, as well as fossiliferous beds, which the late Professor Ralph Tate determined by their molluscan fauna to be of Tertiary age. These two geological factors give some plausibility to the view that the sea-borne materials may have been derived from such a source. I regret that the resinous samples have not been subjected to such an analysis as might enable us to place them in comparison with similar substances from well-known localities.

Aboriginal Occupation of Kangaroo Island.

Prof. Tate, in his excellent resumé of the early history of the Island, says (*loc. cit.*), "Flinders and Peron have each remarked on the absence of any trace of man's sojourn on the Island." In my brief visit I was fortunate in securing unmistakeable evidences of the former presence of the aboriginal race on Kangaroo Island. These evidences were—

1. The occurrence of stone implements showing human workmanship. Eight hammer stones bearing clear evidence of use were picked up by me near Hawk's Nest. They consist of smooth water-worn pebbles of a close-grained quartzite, such as were commonly used by the natives of the mainland as hammer stones or for chipping into implements. The presence of fresh water near Hawk's Nest would make it a suitable place for the natives to camp at, and as I spent two nights on the ground, I had better facilities for obtaining such objects there than at most places visited.

Amongst the blown sandhills of the coast I also obtained some chipped quartz. The workmanship is rough, but there can be no doubt they were made by human agency.

2. A kitchen-midden on top of headland at the east side of bay at the Brecknells. The cliffs are about thirty feet above sea level, with their upper surface slanting gently to the sea. The surface, which has at one time been covered with blown sand, is now bare to the rock, and is literally covered with broken shells over a distance of fifty yards by twenty yards. A great variety of both univalves and bivalves are represented, particularly the former, and amongst these *Turbo undulatus* and *T. stramineus* are conspicuous.

It is difficult to account for such an assemblage of broken sea shells on any other supposition than a native kitchen-midden. Sea birds sometimes form a larder, and will soar with their prey and allow it to drop from a height on a rock to break it, but the enormous quantity of the material, and the greatly shattered condition of most of the shells can only find adequate explanation by assuming the presence of man.

In the retreating sandhills, cut by wind action, layers of shells could also be seen in section, suggesting the probability that, when frequented by the natives, the sand came nearer to the edge of the cliffs, and that its removal by the wind has concentrated the shelly material as a residuum on the bared surface.

The casual residence of native women taken from the mainland, amongst the early settlers, is not sufficient, I think, to explain the facts adduced; and now that attention has been called to this subject it is probable that further evidence of the occupation of Kangaroo Island by an aboriginal population will be secured.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read April 7, 1903.]

XXXII.

CARABIDÆ.

EUCALYPTOCOLA.

The following species seems to be doubtfully referable to this genus. Its structural characters are: tarsi not bilobed; scrobes of mandibles present; postocular prominences of head wanting; mesosternum narrow between the intermediate coxæ; head not transversely impressed across occiput; interstices of elytra glabrous and not punctulate; claws serrate. It stands by virtue of the above characters in *Eucalyptocola*, in Mr. Sloane's tabulation of the *Lebiid* genera (P.L.S., N.S.W., 1898, pp. 493 and 494). It differs, however, from Mr. Sloane's diagnosis of *Eucalyptocola* in having its elytra only feebly striate, and from an insect sent to me by Mr. Sloane as *E.* (*Philophlœus*) *dubia*, Macl., in its prothorax being only narrowly margined so as to resemble the prothorax of *Dromius*. It is much like a *Dromius* in general appearance but differs from that genus not only by its narrow mesosternum but also by its very stout antennæ which are shorter and stouter even than those of *Eucalyptocola dubia*. Its narrowly margined prothorax distinguishes it from *Eucalyptocola* so strongly as to render its right to a place in the genus very doubtful, but if not placed there it must be treated as the type of a new genus and for the present it seems better not to create new *Lebiid* genera in Australia if they can be avoided.

E. marcida, sp. nov. Nitida; nigro-picea, elytris (fascia postmediana lata sinuata et utrinque macula parva basali nigris exceptis) sternorum parte mediana coxis pedibusque testaceis, palpis mandibulis antennis et pronoti margine (hoc anguste) rufo-testaceis; supra lævigata; prothorace sat transverso, postice quam antice parum angustiori, antice leviter emarginato, longitudinaliter canaliculato, lateribus leviter arcuatis prope basin leviter sinuatis anguste marginatis puncturis setiferis 2 impressis, angulis obtusis; elytris

subtiliter striatis, striis subtiliter punctulatis, interstitiis planis vix manifeste (sub lente forti) punctulatis. Long., $1\frac{4}{5}$ l; lat., $\frac{4}{5}$ l.

The coloring of the antennæ in the unique type is not quite uniform, the basal two joints being paler, and the third joint darker, than the rest.

Victoria (Glenelg River).

MORPHNOS.

M. Besti, Sl. I have lately met with this species (recently described by Mr. Sloane) at the mouth of the Glenelg River, in the extreme south-west corner of Victoria. Mr. Sloane appears to have seen it only from the Grampian Mountains (Vict.). It was not rare in deep burrows under large stones and logs quite near the sea, and a good deal of digging was necessary to unearth it.

NOTONOMUS.

N. molestus, Chaud. This species is plentiful under stones and logs about the mouth of the Glenelg River, Victoria. Mr. Sloane seems to have it only from the Grampian Mountains.

DYTISCIDÆ.

ANTIPORUS.

A. (*Hydroporus*) *collaris*, Hope. Referring to my note on this species to the effect that, though (of existing genera) *Antiporus* seems the best for it to stand in, yet I think a distinct genus should be formed for it, but cannot myself form one for want of a satisfactory specimen for examination; Dr Régimbart writes me that he confirms my opinion, and I judge from his letter that he will shortly propose a new generic name for the insect, of which he appears to possess a good specimen.

GYRINIDÆ.

MACROGYRUS.

M. (*Gyrinus*) *obliquatus*, Aubé. Dr. Régimbart agrees with me that there is not sufficient evidence to justify this species being regarded as Australian

M. (*Dineutes*) *Gouldi*, Hope. Dr. Régimbart answers my query as to the possible identity of this species (which I have not seen) with *M. paradoxus*, Rég., by telling me that he has *M. Gouldi*, and that it is certainly distinct from *paradoxus*, having its elytra genuinely tridentate behind.

M. fortissimus, Blackb. Dr. Régimbart tells me that judging by my description he has no doubt of this species being identical with that which Guérin described as *Gyrinus striolatus*. I had formed the opinion that *G. striolatus* is not a *Macrogyrus*, and

that therefore my insect could not be identical with it. M. Régimbart, however, is able to state definitely that *G. striolatus* is a *Macrogyrus*, and therefore I am satisfied that the name I have used must be regarded as a synonym.

DINEUTES.

D. rufipes, Fab. Dr. Régimbart thinks I am probably right in believing this to be the same species as *D. australis*, Fab.

PALPICORNES.

CERCYON.

C. nigriceps, Marsh. Among some *Coleoptera* collected by Mr. P. Morris in the neighbourhood of Adelaide, and also among some specimens collected by Mr. Dodd near Townsville (Queensland), I have found a *Cercyon* which I cannot separate from this common European species. No doubt it has been introduced.

STAPHYLINIDÆ.

QUEDIUS.

Q. nelsonensis, sp. nov. Apterus (?); gracilis; sat nitidus; piceus, abdomine cupreo-et cœruleo-iridescenti, antennarum articulis basali et apicalibus 2 palpis pedibus et elytrorum basi (hac late) testaceis vel rufo-testaceis; antennis gracilibus minus elongatis, articulis 3° quam 2us sat longiori, 7°-10° leviter transversis; capite angusto elongato, fere parallelo, quam prothorax multo angustiori, puncturis 3 utrinque prope oculum impresso; oculis sat parvis depressis; prothorace minus transverso, a basi antrorsum fortiter angustato supra puncturis nonnullis prope margines sitis et 2 magnis in disco ante medium sitis impresso; scutello punctulato; elytris brevibus (ad suturam quam prothorax sat brevioribus), sat crebre sat subtiliter punctulatis; abdomine basin versus subtilius sat crebre (hinc retrorsum gradatim minus crebre magis fortiter) punctulatis. Long., $2\frac{1}{5}$l; lat., $\frac{1}{2}$ l.

Only three Australian *Quedii* of the section with the head elongate and narrow have been previously described. From them the present species differs by its very small and short elytra (under which I feel sure there are no wings, but as the type is unique and in extremely good condition I am unwilling to risk damage by investigation). Apart from this character the species is very distinct from its allies by the following (among other) characters:—From *æneus*, Fvl., by its very different color and size, and the very sparse puncturation of the hind part of its abdomen; from *cuprinus*, Fvl., by its very different size and color (e.g. the apical two joints of its antennæ testaceous, its elytra bicolorous) and (if I have rightly identified *cuprinus*) its elytra more finely punctulate and antennæ notably more slender; from

baldiensis, Black.—to which it seems nearest—by its much more slender antennæ non-convex eyes (in *baldiensis* the eyes are not strongly but very evidently convex) and much closer punctuation of the basal part of the elytra.

Victoria (Nelson R. District).

Q. baldiensis, Blackb. (Trans. R.S., S.A., 1891, p. 69). I described this species as possibly a variety of *Q. cuprinus*, Fvl. I am now, however, satisfied that it is distinct. The small size and testaceous apical joints of its antennæ in combination are, I think, conclusive in themselves. I have, however, a species before me which agrees well with the description of *Q. cuprinus*, and if it be that insect the puncturation of the elytra of *baldiensis* is very evidently finer than in Fauvel's species.

PHILONTHUS.

P. Glenelgi, sp. nov. Niger, elytris rubris; palporum maxillarium articulo 4° quam 3us sat longiori; antennis modicis (quam *P. sordidi*, Grav., sat tenuioribus); capite sat angusto, quam latiori sat longiori, inter oculos 2-punctulato, minus convexo; prothorace antice vix angustato, quam latiori manifeste longiori, quam caput vix latiori, supra utrinque puncturis 4 dorsalibus (inter has et marginem lateralem puncturis 2) longitudinaliter impresso, secundum margines puncturis nonnullis seriatim impresso; elytris quam prothorax sat latioribus vix longioribus, subtilius concinne minus crebre punctulatis; abdomine fere ut elytra punctulato. Long., 3 l.; lat., ½ l.

From all the previously described Australian *Philonthi* of the section having the dorsal series of punctures on the pronotum consisting of four punctures, except *ornatus*, Blackb., this species differs by its bright red elytra. From *ornatus* it differs by its larger size, uniformly dark legs and antennæ, much longer antennæ, more finely punctured elytra, &c. Disregarding the colour of the elytra it differs from the others of the section in the following characters *inter alia* :—from *longicornis*, Steph., by its much smaller size, prothorax much less narrowed in front, elytra much less closely punctulate; from *discoideus*, Grav., and *ventralis*, Grav., by its much longer antennæ; from *macellus*, Fvl., by its more elongate head; from all by its antennæ and legs entirely black.

Victoria (Glenelg R. district).

SILPHIDÆ.

CHOLEVA.

C. Macleayi, sp. nov. Angusta; postice angustata; rufo-ferruginea, elytris interrupte trans partem medianam et pronoti disco infuscatis; confertim castaneo-pubescens;

capite pronotoque sat subtiliter sat crebre punctulatis; elytris transversim subtiliter crebre punctulato-striatis; antennis elongatis, gracilibus, articulo 8° quam 7us et 9us multo angustiori multo breviori; mesosterno carinato. Long., $1\frac{1}{2}$ l.; lat., $\frac{3}{4}$ l.

The antennæ are manifestly longer than the head and prothorax together. They are a trifle shorter and stouter than those of *C. antipodum*, Blackb. Joint 1 is evidently longer and stouter than 2; 3 scarcely shorter than 1; 4-6 each a little shorter than the one that precedes it; 7 of same length as 6 but evidently stouter; 8 small, its length and width about equal; 9 and 10 about as wide as 7 but slightly shorter; 11 evidently longer than 10. The front tarsi are extremely strongly dilated in the male, the intermediate not at all. In my tabulation of the Australian *Cholevæ* (Tr. R S., S.A , 1891, p. 89) this species falls beside *C. antipodum*, from which it differs *inter alia* by the transverse sculpture of its elytra.

Victoria.

C. victoriensis, Blackb. Since I described this species I have met with it in Tasmania.

C. australis, Er. The Adelaide *Cholera* referred to in Tr. R.S., S.A., 1891, p. 87, as probably this insect seems to have been correctly named, as I have since taken the same species in Tasmania (the original locality).

COLON.

C. melbournense, Blackb. Since I described this species I have taken a *Colon* in Tasmania which does not seem to differ from the type except in its uniform castaneous coloring.

CHOLEVOMORPHA.

Notwithstanding the general resemblance of this genus to, and the really close agreement of most of its characters with, *Cholera*, it nevertheless seems to me to be a very isolated form intermediate between the *Silphides* and the *Anisotomides*. In my diagnosis of the genus I called its tibiæ "spinosæ," and I think this phrase capable of misapprehension. In using it I referred to a row of fine erect spines which run down the external margin of the tibiæ, rising from the pubescence with which those organs are clothed. In reality the tibiæ are very much like those of a *Choleva* and very different from that of an *Anisotoma*.

CHOLEVOMORPHA.

C. Koebelei, sp. nov. Sat late ovalis; sat convexa; subtiliter sublineatim pubescens; nitidus; ferrugineus, antennis apicem versus et elytrorum postice disco infuscatis; antennis gracilibus, clava 5-articulata, articulis 7°—10° piceis, 11° dilu-

tiori, 8° parvo vix transverso, 7° 9° 10° que quam latioribus parum longioribus; prothorace fortiter transverso, antice angustato, supra vix manifeste punctulato; elytris transversim subtiliter punctulato-striatis, stria subsuturali profunde impressa.

Maris tarsis anticis 3-unguiculatis, ungue intermedia brevi triangulari; feminæ tarsis 2-unguiculatis. Long., 1 l.; lat., $\frac{2}{5}$ l. (vix).

This species is clearly congeneric with the extraordinary insect on which I founded the genus *Cholevomorpha*. It is much smaller and very differently colored, but agrees with it in structural characters; having most of the characters (including the exposed metathoracic episterna), as well as the general appearance of *Choleva*, but in combination with hind trochanters quite small and placed as in the *Anisotomides*. Like *C. picta* this species has three claws on the front tarsi of the male, but they are extremely small—one of the external claws much smaller than the other, and the intermediate claw of very different shape appearing as a small triangular projection between the other two.

Queensland (Mr. Koebele, Cairns).

C. atropos, sp. nov. Fem. Sat late ovalis; sat convexa; subtiliter sublineatim pubescens; nitidula; nigra, antennis (his ad basin testaceis) pedibusque piceo-rufescentibus; antennis modice gracilibus, clava 5-articulata, articulis 8°-10° manifeste transversis, 8° parvo; prothorace fortiter transverso antice angustato, vix manifeste punctulato; elytris transversim sat fortiter punctulato striatis, stria subsuturali profunde impressa. Long., $\frac{4}{5}$ l; lat., $\frac{1}{2}$ l. (vix).

This minute insect is evidently a *Cholevomorpha*, but as my unique specimen is a female I am unable to describe its sexual characters. It differs from the two previously described species *inter alia* in size and coloring, in its more conspicuously clubbed antennæ (some of the joints of which are decidedly transverse) and in the much coarser sculpture of its elytra.

Victoria.

C. (?) *extranea*, sp. nov. Fem. Minus late ovalis; sat convexa; parcius pubescens; sat nitida; picea, antennis pedibus abdomine et elytrorum pleuris plus minusve rufescentibus; antennis modice robustis, apicem versus gradatim magis incrassatis, articulo 8° quam 7us et quam 9us sat minori leviter transverso, articulis ceteris haud vel vix transversis; corpore supra sat æqualiter fortiter vix crebre punctulato; prothorace fortiter transverso, postice leviter (antice fortiter) angustato, stria subsuturali vix perspicua; corpore subtus sat fortiter punctulato. Long., 1$\frac{3}{5}$ l.; lat, $\frac{3}{5}$ l.

I have some hesitation in referring this insect to *Cholevomorpha* rather than founding a new genus for it. Unfortunately I have not seen the male. I do not find in the female any good structural character to distinguish it from *C. picta*—though it is very different superficially, but not more so, I think, than are some *Cholevæ* from others. It agrees with *C. picta* in being of decidedly *Cholevid* rather than *Anisotomid* type in general (in respect e.g., of the antennæ, metasternal epimera, style of sculpture), but has hind trochanters of the *Anisotomid* type. Its elytral suture is considerably raised (except near the base) as in the previously described *Cholevomorphæ*, but without the strong subsutural stria that is found in them. It is *inter alia multa* very different from them by the coarse, evenly distributed puncturation of its upper surface which is not in the least seriate. Its antennæ are notably stouter than those of its described congeners, especially the first six joints, in consequence of which the apical five joints form a much less conspicuous club. Its tarsi, too, are distinctly shorter and stouter, and the fine spines on its tibiæ are shorter, less fine, and less erect.

S. Australia; under decaying leaves.

CLAMBUS.

C. tropicus, sp. nov. Minus brevis; postice angustatus; nitidus; supra (exemplo typico observato) glaber; obscure rufus, antennis (clava inclusa) pedibusque (posticis haud observatis) pallide testaceis; elytris postice sparsissime minus subtiliter punctulatis, stria subsuturali nulla. Long., ½ l. (vix).

I have not been able to examine the antennæ and hind legs of this minute insect sufficiently in detail to give a full description of them, as I have only a single specimen. The upper surface is practically glabrous, but under a microscope I find one or two short erect setæ close to the lateral margin of the elytra, which perhaps indicate that the example before me is abraded; a fresh specimen certainly cannot have more than extremely scattered setæ. This species differs from *C. Tasmani*, Blackb., and *C. tierensis*, Blackb., in the absence of a subsutural elytral stria, and from *Simsoni*, Blackb., by the very evidently more sparse puncturation of its elytra.

Queensland; Cairns (Mr. Cowley).

SCAPHIDIIDÆ.

SCAPHISOMA.

This genus seems to be numerously represented in Australia. The species as yet described stand under five names, none of which are connected with descriptions sufficiently detailed to allow of confident identification. The two descriptions of Sir W.

Macleay are of such a kind that they can only be disregarded. Read literally, I have certainly seen no species that they could apply to, one (*S. politum*) being indicated as devoid of puncturation, and the other (*S. punctipenne*) as having the elytra "rather thickly punctured," the size of the latter being given as $\frac{1}{3}$ l., which indicates it as much smaller than any *Scaphisoma* that I have seen. I must pass them by with the expression of a doubt whether they belong to the genus. The other three species were described by Reitter in brief terms, dealing only with the coloring, the form of the subsutural stria, and the general character of the puncturation. In respect of one of these (*S. bifasciatum*) the puncturation is dismissed with the remark "subtilissime punctatum" (applied to the whole insect); another (*S. Gestroi*) is said to have the elytra (apparently the whole elytra) "dense punctata," while the third (*S. Albertisi*) is said to have elytra "dense subtiliter punctata." I have seen no *Scaphisoma* with puncturation which any of the above designations would even approximately characterise; and as, moreover, the coloring of all Reitter's species differs considerably from that of all the species before me, I must conclude that they are all unknown to me.

S. queenslandicum, sp. nov. Late ovale; nitidum; glabrum; nigrum, antennis (his apicem versus infuscatis) palpis pedibus abdomine et pygidii parte postica rufis vel testaceis; capite pronotoque lævibus; elytris antice sparsissime vix perspicue (juxta suturam et ultra medium gradatim magis crebre magis perspicue, prope apicem fere ut *S. agaracini*, Leach) punctulatis, stria subsuturali subtili antice extrorsum versa et sat longe continua; metasterno antice convexo lævi, postice perspicue punctulato, versus apicem foveis 2 sat approximatis leviter impressis, his sulco subtili conjunctis; segmento ventrali basali antice sulco transverso profundo impresso. Long., 1 l.; lat., $\frac{1}{2}$ l.

This species is somewhat closely allied to *S. novicum*, Blackb. It is a little larger, without testaceous coloring in the apical part of the elytra, the subsutural elytral stria much less strong, the front part of the elytra (except close to the suture) not distinctly punctulate, the front part of the metasternum not punctulate, the abdomen bright red. The impressions on the metasternum and basal ventral segment are perhaps sexual.

Queensland; Cairns (Mr. Cowley).

S. perelegans, sp. nov. Late ovale; nitidum; glabrum; nigrum, capite antice prothoracis lateribus (late) margineque antico (anguste) elytris (basi, suturæ parte antica dimidia, fascia submediana angulata, et macula subapicali parva, nigris vel piceis exceptis) pygidio palpis coxis pedibus et in corpore

subtus maculis nonnullis testaceis, antennis (basi testacea excepta) fusco-brunneis; capite prothoraceque sat lævibus; elytris antice sparsim subtiliter (nullo modo obsolete) postice gradatim minus subtiliter vix magis crebre punctulatis, stria subsuturali profunde impressa antice extrorsum vix versa. Long, 1 l; lat., ½ l.

My unique example of this insect is unfortunately not in condition to render advisable the manipulation that would be required to remove it from the gum in which it is deeply imbedded and clean it sufficiently for an examination of the puncturation of its sterna. Its colour and markings are however so entirely different from those of any previously described Australian *Scaphisoma* that it is very easily recognizable. The puncturation of the front part of its elytra is much more distinct than in either *S. novicum*, Blackb., or *queenslandicum*, Blackb. (it is as strong as in the European *S agaricinum*, Leach).

Victoria.

S. fernshawense, sp. nov. Ovale, modice latum; nitidum; glabrum; brunneo-testaceum, elytris maculis 2 (altera humerali, altera subapicali) nigris sat magnis ornatis, sternis abdomineque (hujus apice excepto) piceis, antennis (basi testacea excepta) obscurioribus; capite prothoraceque sparsim subtiliter (nullo modo obsolete), elytris grosse minus crebre inæqualiter (hic et illic seriatim), punctulatis; horum stria subsuturali profunde impressa fortiter punctulata, antice extrorsum versa et longe arcuatim continua; meta sterno in medio subtiliter (latera versus grosse) punctulato. Long., 1 l.; lat., ½ l. (vix).

Very distinct from all the previously described Australian *Scaphisomata* by the extremely coarse puncturation of its elytra, which is intermingled with somewhat less coarse puncturation and here and there runs in rows, especially near the suture and lateral margins. The subsutural stria in front is continued in a curved row of punctures and merges into a discal row of coarse punctures that runs obliquely backward and almost meets the subsutural stria at the apex of the elytra. There are some rather coarse punctures along the base of the pronotum.

Victoria, Fernshaw.

S. novicum, Blackb. The examination of fairly numerous specimens of *Scaphisoma* that have come under my observation since I described this species has led me to doubt whether the specimen whose characters are set down in my description as those of the male is really conspecific with those on which the rest of the description was founded. I have no evidence of similar sexual characters in any other species, and moreover I

have much doubt whether the immature specimen in which I found the character that I mentioned as those of the male could even with maturity have reached the dark colors described as those of *novicum*. On the whole, therefore, it will be best to consider the authenticity of my statement of the sexual characters of the male of *S. novicum* as needing confirmation.

Tabulation of Species of Scaphisoma.

A. Puncturation of elytra more or less fine, and chiefly in the hind part of the elytra.
  B. Elytra uniformly (unless rufous at apex) black.
    C. Disc of elytra scarcely punctulate in front (abdomen bright red) ... ... *queenslandicum*, Blackb.
    CC. Disc of elytra very distinctly punctulate in front (abdomen obscure) ... *novicum*, Blackb.
  BB. The whole upper surface testaceous with sharply defined black markings ... *perelegans*, Blackb.
AA. Puncturation of elytra extremely coarse and sparse over the whole surface ... *fernshawense*, Blackb.

SCIATROPHES (gen. nov. *Scaphidiidarum*).

Oculi minores, sat convexi, integri; caput antice elongatum angustatum; antennæ 11-articulatæ, graciles, elongatæ, articulis basalibus 2 brevibus incrassatis 3°—6° elongatis subtilibus 7° quam hi manifeste crassiori parum longiori 8° quam 7us sat breviori sat graciliori 9°—11° quam 7us parum longioribus sat crassioribus (clava laxe articulata, modice perspicua); scutellum haud manifestum; elytra postice truncata, abdomen haud tegentia; prosternum ante coxas brevissimum; coxæ anticæ contiguæ, intermediæ inter se modice separatæ, posticæ inter se sat late distantes; metasterni episterna angusta; abdominis segmenta basale elongatum, 2um—4um brevia, 5um elongatum conicum; pedes modici, tarsis sat brevibus 5-articulatis, posticis quam tibiæ dimidium parum longioribus.

The species for which I propose this new generic name is near *Scaphisoma* but cannot be placed there on account of its much shorter tarsi, and much narrower metasternal episterna Its antennæ, moreover, are of structure somewhat different from those of any *Scaphisoma* known to me. Their club is five-jointed strictly speaking, but its first joint is so slightly enlarged in comparison with the apical three, that to a casual glance it seems to be only three-jointed. The eyes are smaller and more convex than in *Scaphisoma*.

S. latens, sp. nov. Scaphiformis; nitidus; glaber; supra nigropiceus versus latera apicemque rufescens, pygidio testaceo, corpore subtus rufo piceo, antennarum basi palpis pedibusque testaceo-rufis; capite pronotoque lævibus; elytris antice

sparsim sat obsolete (postice gradatim magis perspicue, prope apicem nullo modo obsolete) subtiliter punctulatis, stria subsuturali profunde impressa antice extrorsum versa et sat longe continua. Long., ⅞ l.; lat., ⅜ l. (vix).

The structural characters have been indicated under the heading of the genus. The facies is much like that of *Scaphisoma* but the body is more narrowed hindward from slightly behind the front of the elytra than in any *Scaphisoma* known to me.

Victoria; Dividing Range. In a fungus deeply imbedded in a hollow log.

HISTERIDÆ.

HOLOLEPTA.

H. australica, Mars. I presume that this is the species referred to by Mr. Lea (P.L S., N.S.W., 1897, p. 585) under the name *H.* "*australis*, Mars." By some oversight the name was printed *australis* in Masters' catalogue, from which apparently Mr. Lea adopted it; but de Marseul does not appear to have described any *Hololepta* under the name *australis*.

TRYPANÆUS.

This genus is attributed to Australia in Masters' Catalogue, a species "*Somerseti*, Mars., Ann. Mus. Gen., 1879, p. 281", being quoted. On reference to the memoir cited I find that on p. 281 there is a *Teretrius Somerseti*, which is unquestionably a *Teretriosoma*, nor can I find any *Trypanæus Somerseti* in the memoir. The genus *Trypanæus*, therefore, appears to have been erroneously attributed to Australia.

PAROMALUS.

I am afraid it is almost impossible to identify with any certainty the four Australian species of this genus described by De Marseul without a comparison of specimens with the actual types. I have received from Mr. Lea examples bearing the names of three of them, and I believe that gentleman has been in correspondence with Mr. Lewis, and has received information from him regarding nomenclature It is, therefore, likely that the specimens sent me were named by Mr. Lea by comparison with specimens named by Lewis. As, however, they do not agree with De Marseul's descriptions, and two of them are from localities widely separated from those of De Marseul's types (while of the third De Marseul does not seem to have known the habitat exactly), I cannot consider the identification conclusive. I, however, must accept the names provisionally, as there is a possibility that they may have been ascertained definitely by Lewis to agree with the types in spite of divergence from the

descriptions. The following are notes on these named specimens, and on the fourth of De Marseul's species.

P. umbilicatus, Mars. Specimens before me are from W. Australia; the type was from Sydney. The specimens before me differ from description *inter alia* by the extremely well-defined puncturation of their metasternum, which should be "almost invisible." The pygidium is quite differently sculptured, but this is possibly sexual.

P. Victoriæ, Mars. Specimens before me are from N.S. Wales; the type was from Victoria. The specimens differ from description *inter alia* in the puncturation of the elytra being very much finer and closer than is indicated by De Marseul's expression "grosse espacée, et de points oblongs," and in the stria-surrounded area of the pygidium in the female being (not "triangular" but) oval.

P. miliaris, Mars. Specimens before me are from W. Australia, whence I have other examples than those received from Mr. Lea; De Marseul gives merely "N. Hollande" as the habitat. The specimens I have under observation have no unevenness on the pygidium, but this discrepancy may be sexual. Otherwise, however, *inter alia* their elytra are particularly finely and closely punctulate, whereas De Marseul says of the elytra of *miliaris* "couvertes de points forts et assez serrés."

P. honoratus, Mars. This species is very briefly described, but cannot be identical with either of the species (from the same habitat—tropical Queensland) described below, as it is said to have the stria of the head interrupted in front. My specimens and De Marseul's type appear all to be females, as they have the sculpture of the pygidium said to be characteristic of that sex. If so they are very distinct species, as the details of that sculpture are quite different *inter se* in all three.

The following tabulation shows the distinctive characters of the *Paromali* before me. I have retained Mr. Lea's names, with a query—the name in each case being applied to the specimens indicated in the above notes, and very probably not representing the species to which De Marseul gave the names. I have not included *honoratus*, as the description does not furnish the necessary information. It differs from all those tabulated except *miliaris* in the absence of a stria across the front of the epistoma.

A. Metasternum deeply longitudinally concave, in its whole length, on either side ... ... *saucius*, Blackb.
AA. Metasternum with the disc perfectly flat ... *Terræ-reginæ*, Blackb.
AAA. Metasternum evenly convex (or nearly so) in respect of its general surface.
B. Two short adjacent furrows on the metasternum close to its front ... ... *Ludovici*, Blackb.
BB. The metasternum without depressions.

C. The metasternum impunctulate, except at the postero-external corners ... ... *Victoriæ* (? Mars.)
CC. The general surface of the metasternum very distinctly punctulate.
D. The puncturation of the metasternum very sparse ... ... *umbilicatus* (? Mars.)
DD. The puncturation of the metasternum close ... ... *miliaris* (? Mars.)

P. saucius. Fem? Ovalis; minus convexus; sat nitidus; niger, antennis pedibusque ferrugineis; capite crebre subtiliter punctulato, stria antice continua recta instructo; prothorace transverso antice angustato, supra crebre subtilius punctulato, trans marginem apicalem stria subtilissima (hac cum stria laterali vix continua) impresso; elytris sat crebre sat fortiter (antice versus suturam multo magis subtiliter) punctulatis, striis 2 dorsalibus minus perspicuis postice abbreviatis et stria subsuturali apicali brevissima instructis; propygidio pygidioque subtilissime punctulatis, in hoc area transversim ovali stria continua circumcinta (hac area postice fovea profunda impressa); prosterno utrinque striato; mesosterno antice arcuatim emarginato, transversim stria impresso, hac ad fines obtuse angulata et retrorsum continuata; metasterno fere lævi, utrinque late longitudinaliter sulcato, sulco in segmento basali ventrali (hoc distincte sparsim punctulato) continuo; tibiis anticis extus minute 4-dentatis. Long., 1 l., lat., ½ l.

Very distinct from the other described Australian *Paromali* by the wide sulcus longitudinally impressing either side of the metasternum and continued on the basal ventral segment; also by the characteristic sculpture of its pygidium. I have seen five specimens of this insect which do not seem to differ sexually *inter se.*

N. Queensland (Mr. Koebele).

P. Terræ-reginæ, sp. nov, Fem.? Ovalis; sat latus; sat depressus; nitidus; niger, antennis pedibusque obscure ferrugineis; capite crebre subtiliter punctulato, stria antice continua recta instructo; prothorace transverso antice angustato, supra subtilius sat crebre punctulato, stria submarginali pone caput vix perspicua; elytris sat crebre vix fortiter (antice versus suturam magis subtiliter) punctulatis, striis dorsalibus 2 et stria subsuturali apicali brevissima vix perspicue impressis; propygidio perspicue, pygidio vix perspicue, punctulatis; hoc in medio sulco profundo transverversali (certo adspectu literam M latissimam simulanti) impresso; prosterno inter coxas sat lato, utrinque striata; mesosterno antice arcuatim emarginato, transversim stria impresso, hac ad fines obtuse angulata et retrorsum con-

EE. Subsutural elytral stria continuous with fourth dorsal ... ... *ripicola*, Mars.
DD. Prosternum devoid of marginal striæ.
E Front tibiæ with five teeth externally ... *irinus*, Mars.
EE. Front tibiæ with only four teeth externally ... ... *viridipennis*, Lewis.
CC. Elytra having no (or scarcely a trace of a) subsutural stria (GNATHONCUS) ... *incisus*, Er.
BB. Head with a frontal carina (HYP. CACCUS) ...
C. External subhumeral stria of elytra wanting.
D. Humeral stria of elytra bifid behind ... *piscarius*, Blackb.
DD. Humeral stria of elytra not bifid behind *sinæ*, Mars.
CC. External subhumeral stria of elytra well defined and deep ... ... *vernulus*, Blackb.

S. tyrrhenus, sp. nov. Nitidus; obscure purpureus, antennis pedibusque obscure brunneis; capite lævi, stria frontali integra; prothorace transverso, supra in disco lævi (latera versus, sed a margine sat procul, fortiter vix crebre punctulato, area punctulata postice fortiter abbreviata), stria marginali integra; elytris pone humeros sat fortiter dilatatis, in parte dimidia (vel etiam plus quam dimidia) postica subtilius vix crebre punctulatis, striis dorsalibus 1—3 elytra media fere attingentibus (4ª ut arcus brevis basalis visa), stria suturali antice abbreviata, humerali ultra medium interrupte extensa, subhumerali brevi basali, interstitiis lævissimis; pygidio modice convexo, subtilius sat crebre æqualiter punctulato; prosterno sat plano, stria marginali integra; mesosterno fortiter transverso, stria integra; sternis (sutura crenulata excepta) lævibus; tibiis anticis extus 5-dentatis, dentibus superioribus 2 parvis (inferioribus 3 magnis acutis). Long., 2 l.; 1 $\frac{1}{5}$ l.

This small species in the striation of its elytra resembles *S. cyanellus*, Mars., near which would be its place in De Marseul's tabulation referred to above, but from which it differs, *inter alia*, by the extremely nitid and punctureless interstices of its elytra and by the very different armature of its front tibiæ.

N.S. Wales; Tolarno (Miss Carnie).

S. westralicnsis, sp. nov. Nitidus; obscure viridis, antennis pedibusque brunnescentibus; capite obsolete punctulato, stria marginali integra; prothorace transverso, supra in disco lævi (latera versus, sed a margine sat procul, fortiter vix crebre punctulato, area punctulata postice fortiter abbreviata), stria marginali integra; elytris pone humeros rotundato-dilatatis, in parte dimidia (vel potius minus quam dimidia) postica subtilius sat crebre punctulatis, striis dorsalibus 1—2 elytra media attingentibus (3ª paullo breviori, 4ª ut arcus brevis basalis visa), stria suturali antice abbreviata, humerali ultra medium extensa, subhumerali brevi

basali, nterstitiis 1ª 2ª que totis (3ª antice) punctulatis; pygidio modice convexo, æqualiter minus subtiliter sat crebre punctulato; prosterno minus convexo, stria marginali fere integra (basin vix attingenti); mesosterno stria marginali integra impresso; sternis sat lævibus; tibiis anticis extus 7-dentatis, dentibus a femore deorsum ad sextum gradatim majoribus (6° nullo modo magno, 7° quam 6ᵘˢ paullo minori). Long., 2⅞ l; lat. 1⅞ l.

This species would fall beside *S. cyanellus*, Mars., in that author's tabulation (cited above). From *S. tyrrhenus*, Blackb. (which is also near *cyanellus*) it differs, *inter alia*, by the armature of its front tibiæ and by the puncturation of its elytral interstices. From *S. cyanellus* it differs, *inter alia*, by its uniform dark-green color, by the interstice between the second and third elytral striæ being punctulate only at the extreme base, and by the lateral punctulate area of the pronotum being a narrow strip separated from the lateral margin by an interval almost of its own width and also widely separated from the basal margin of the segment. In the last named character it agrees with *S. tyrrhenus*. In the typical unique example there are distinct traces of a dorsal stria on the hinder part of each elytron placed so as to appear like an apical continuation of the third stria after a wide interruption.

W. Australia.

S. viridicupreus, Blanch. The description of this species suggests identity with *S. speciosus*, Er.

S. viridipennis, Lewis. I have specimens from Central Australia of a *Saprinus* which seems to differ from *S. viridipennis* only by its very much more strongly punctulate elytra and its smaller size (Long., 2⅓ l.). As careful comparison reveals no other difference I suspect that the distinction is sexual.

S. Australasiæ, sp. nov. I propose this name for *S. lætus*, Mars. (nec Er.), the synonomy of which will stand, I think, as follows

S. Australasiæ, Blackb.
cyaneus, Payk. (nec Fabr.)
lætus, Mars. (nec Er.)
cyaneus, Er. (nec Fabr.)

S. cyaneus, Fab. The synonomy of this species appears to be
S. cyaneus, Fab, Mars.
lætus, Er.

HYPOCACCUS.

Of this genus (Groupe VI. of *Saprinus* according to De Marseul), not hitherto reported as Australian so far as I know, I have several species before me. One of them agrees fairly well

with De Marseul's description of his *H. (Saprinus) sinæ* (from China), under which name I have received it from Mr. Lea, probably on the authority of Mr. Lewis. The following species seem to be new

H. piscarius, sp. nov. Nitidus; nigricans, parum ænescens, antennis pedibusque brunnescentibus; fronte carinata, sulcis 2 angulatis; prothorace transverso, antice parum angustato, supra antice et latera versus in area lata (hac marginem fere attingenti)—postice angusta—sat fortiter minus crebre punctulato, stria marginali integra; elytris in partibus duabus posterioribus (lateribus exceptis) sat fortiter vix crebre punctulatis, striis validis, 1—4 dorsalibus ad medium abbreviatis inter se sat æqualibus, 4ª ad basin arcuatim cum suturali integra coeunti, subhumerali externa nulla interna sat late disjuncta, humerali postice bifida; pygidio minus crebre punctulato; prosterno antice spatuliformi, striis approximatis parallelis fere integris; mesosterno marginato, lævi; tibiis anticis extus 6-dentatis. Long., $1\frac{1}{8}$—$1\frac{4}{5}$ l.; lat., $\frac{7}{8}$—$1\frac{1}{10}$ l.

Resembling the species referred to above as *H. sinæ*, Mars., but less brassy, of wider build, with the elytra more dilated behind the shoulders, the punctures about the sides of the pronotum larger and less close, as also those of the elytra and pygidium, the humeral stria of the elytra bifid behind. It is found under dead fish.

Australia; near Adelaide. Also from Victoria (Frankston, Mr. Kershaw).

S. vernulus, sp. nov. Nitidus; nigricans, obscure viridescens, antennis pedibusque piceis; fronte carinata, sulcis 2 angulatis; prothorace transverso, antice parum angustato, supra antice et latera versus in area lata (hac marginem fere attingenti)—postice anguste—fortiter sat crebre punctulato, stria marginali integra; elytris ab apice ultra medium (lateribus exceptis) subfortiter sat crebre punctulatis, striis validis 1—4 dorsalibus paullo ultra mediam abbreviatis inter se sat æqualibus, 4ª ad basin arcuatim cum suturali integra coeunti, subhumerali externa profunda brevi basali interna vix disjuncta (inter humeralem et marginem sulco brevi profundo), humerali modica; pygidio æqualiter crebre punctulato; prosterno striis approximatis parallelis fere integris impresso; mesosterno marginato, lævi; tibiis anticis extus 6-dentatis. Long., 2 l. (vix); lat. $1\frac{3}{10}$ l.

Its distinctly green colour in combination with elytra having a very strong external subhumeral stria renders this species very distinct from the other Australian *Hypocacci* before me. The

short deep sulcus close to the hind end of the humeral elytral stria (between it and the lateral margin) is an unusual character. The puncturation of the elytra and pronotum is a little stronger and less close than in the species referred to above as *S. sinæ*, Mars., but that of the pygidium does not differ much from that species. The front of the prosternum is spatuliform as in the preceding species and other *Hypocacci*, but the sides being more strongly declivous this spatuliform shape is less conspicuous.

N.S. Wales; near Sydney. (Mr. Masters; his No. 99.)

TERETRIUS.

T. Doddi, sp. nov. Cylindricus, sat latus; sat nitidus; piceus, latera versus nonnihil rufescens, antennarum clava testacea, tibiis tarsisque plus minusve rufescentibus; capite subtilius sat crebre punctulato; prothorace transverso, supra inequaliter (ab apice retrorsum gradatim minus subtiliter) punctulato, stria integra impresso, lateribus antice sinuatis; elytris sat crebre subfortiter (in parte postico-extero minus perspicue) punctulatis, haud striatis; prosterno subplano, crebre subfortiter punctulato, postice triangulariter emarginato, striis bene definitis vix ultra medium continuis; mesosterno marginato (basi excepta), sat fortiter minus crebre punctulato, antice triangulariter producto; metasterno utrinque stria recta (hac vix ultra medium continua) impresso, sparsim subtilius (ad latera sat fortiter) punctulato; pygidio subtiliter sat crebre punctulato; tibiis anticis 5 denticulis (e his basali valde minuto), intermediis 6 (e his basali valde minuto, 2°—4° inter se propinquis, 5° 6° que prope apicem positis), posticis 5 (e his basalibus 3 valde minutis) armatis. Long., 1 l.; lat., ½ l. (vix).

The only previously described Australian *Teretrius* with 5-denticulate front tibiæ is *T. australis*, Lewis, of which I have an example sent to me by Mr. Lea (it was sent as *T. basalis*, Lewis, but is clearly not that species, as *inter alia* it has 5-denticulate front tibiæ and the mesosternum obtuse in front). The present species differs from it *inter alia* by its mesosternum quite sharply triangular in front and its elytra very considerably more strongly punctulate.

Queensland (Mr. Dodd).

TERETRIOSOMA.

Of this genus two Australian species (*melburnius*, Mars., and *Somerseti*, Mars.) have been described. They were attributed to *Teretrius* by their author. They are readily distinguishable according to their author (though closely allied) by *inter alia* the front tibiæ of the former having 7 denticles and those of the latter only 5. The former is a common species in Southern

Australia,—the latter (from the far North of tropical Australia) I have not seen. I am somewhat puzzled by a remark Mr. Lewis makes—Ann. Nat. Hist. (6), IX., p. 353—to the effect that *Teretrius Walkeri*, Lewis, was found in Tasmania in company with *Teretriosoma Somerseti*, Mars., and am somewhat inclined to wonder whether he accidentally wrote "*Somerseti*" when he intended "*melburnius*." I have examples of a *Teretriosoma* taken by Mr. Walker in Tasmania and ticketed "*Somerseti*," which are certainly not that species (at least they do not agree with de Marseul's description) for they have seven teeth on their front tibiæ, and I have myself met with the same insect in Tasmania. They are very close to *T. melburnius*, Mars., but a certainly distinct species ; I describe it below.

I may here remark that I cannot find in the Australian *Teretriosomata* the sexual antennal characters which Lewis alludes to as present in American members of the genus; the sexes, however, are easily distinguished by the sculpture of their pygidium. In one sex (which I take to be the female) the surface of that segment is uneven (variously according to the species), in the other it is without inequalities.

I should add that I have no ground for attributing these species to *Teretriosoma* except Lewis' use of the name for *T. Somerseti* and de Marseul's statement that it and *T. melburnius* are very closely allied; but they are certainly very distinct from *Teretrius*. I have not seen Horn's diagnosis of *Teretriosoma*.

T. gradile, sp. nov. Subcylindricum, modice latum; glabrum; nigro-piceum, latera versus vix rufescens, corpore subtus dilutiori, antennis (harum clava testacea) pedibusque obscure rufis; capite pronotoque subtilius sat crebre (fere ut *T. Melburnii*, Mars.) punctulatis; elytris haud striatis, apicem et latera versus sat dense minus subtiliter (versus scutellum gradatim minus dense magis subtiliter, prope scutellum subtilissime sparsissime) punctulatis; pygidio sat crebre sat fortiter (apicem versus nonnihil rugulose) punctulato; prosterno sat fortiter vix crebre punctulato, haud striato; tibiis anticis denticulis 7, posterioribus 6, armatis. Long., $1\frac{1}{8}$ l.; lat, $\frac{7}{10}$ l.

This species is very close to *T. Melburnius*, Mars.,—in fact I do not observe any well-defined difference except in the puncturation of the elytra, which however is extremely well marked. My unique example is of the sex which has the pygidium even; I have little doubt that the inæqualities on that segment in the other sex are different from the corresponding inæqualities in *melburnius*. The gradual fading away of the puncturation on the elytra from the apex and sides towards the scutellum is very

peculiar; the space round the scutellum is almost punctureless and strongly nitid. The scutellum itself is scarcely visible. The upper three spinules on the hind tibiæ are very small.

Victoria.

T. sorellense, sp. nov. Subcylindricum, minus latum; sat nitidum; piceo-nigrum, corpore subtus dilutiori, pronoti angulis anticis antennis pedibusque rufis; supra sat crebre sat æqualiter punctulatum; prothorace ad latera leviter sat æqualiter arcuato supra stria integra impresso; scutello haud perspicuo; elytris haud striatis; prosterno convexo sat fortiter sat dense punctulato, postice triangulariter emarginato, haud striato; mesosterno marginato, antice producto-triangulo, fortiter nec dense punctulato; metasterno stria arcuata (hac semicirculum coxam intermediam cingentem formanti) impresso, in parte mediana sparsim subtilius (ad latera magis fortiter) punctulato; tibiis anticis 8- (e his denticulis apicalibus 2 fere conjunctis), intermediis 6 (e his basali valde minuto), posticis 6- (e his basalibus 3 valde minutis) denticulatis.

Maris (?) pygidio æquali, apicem versus minus late ruguloso; feminæ (?) pygidio apicem versus late ruguloso et hic late vix profunde concavo. Long., $1\frac{1}{10}$ l.; lat., $\frac{1}{2}$ l.

Another close ally of *T. melburnius*, Mars. It is distinctly of narrower and slighter form than that insect, but I cannot specify any other well defined difference apart from the sexual characters in the pygidium of one sex. In *melburnius* the inequality on that segment is caused by the apical one third of the surface being on a different plane from that of the basal portion, —a slightly lower plane,—and the transition from the one plane to the other being sudden there is a perfectly distinct (though not sharply marked except in the middle) transverse line of demarcation, which is more or less angular (the angle pointing hindward) in the middle; the portion on the lower plane is strongly rugulose. In *sorellense* the same sex has practically *no* line of demarcation between the smooth and rugulose puncturation of the pygidium but the rugulosely punctured surface is widely and very distinctly (though scarcely deeply) concave down its middle, the concavity being non-existent in *melburnius*.

Tasmania; Lake Sorell, &c.

PHALACRIDÆ.

LITOCRUS.

L. maritimus, sp. nov. Ovalis; nitidus; niger vel nigro-piceus, corpore subtus capite antice antennis palpis pedibusque rufo-testaceis; capite pronotoque sublævibus; hujus stria laterali ad apicem continua hinc intus breviter directa; antennarum

articulo 8° parvo transverso; elytris fere lævibus, stria subsuturali (prope basin excepta) bene determinata, stria 2ª quoque bene determinata, a subsuturali antice late divisa postice contigua (cum hac paullo ante apicem profundiori); tarsorum posticorum articulo basali 2° 3° que conjunctis vix breviori. Long., 1 l.; lat., ½ l.

A very distinct species, differing from all its described congeners, except *frigidus*, Blackb, by the presence of a second stria on the elytra similar to the subsutural stria. In the other species having more striæ than the subsutural one the striæ are numerous. The present species differs from *frigidus* in its coloring and in the absence of elytral puncturation. In the tabulation of *Litocrus* (Tr. R.S, S.A., 1902, p. 294) *L. maritimus* must be placed beside *frigidus*.

Victoria; on flowers at the mouth of the Glenelg River.

NITIDULIDÆ.

HAPTONCURA.

There are a great number of species of small *Nitidulidæ* allied to *Epuræa* occurring in Australia, many of which are now before me. I have tried to distribute them among the genera which Reitter distinguished from *Epuræa* but without success, as few of them fit any of his diagnoses quite satisfactorily and some of those which are the closest *inter se* incline more or less markedly to fall into different ones of his genera. I have therefore placed them all provisionally in *Haptoncura*,—which cannot be far wrong for any of them and seems to be certainly right for some.

Of the species which I have previously attributed to *Haptoncura* I think *victoriensis* should be transferred to *Epuræa*, and I should suppose (from the description) *E. Simsoni*, Grouvelle to be extremely close to it; I presume, however, that it is distinct as I sent *victoriensis* to M. Grouvelle previously to the time when he described *E. Simsoni*.

No other of the species I have previously described, and none of those described below, can be, I think, referred to *Epuræa*. Some of them probably resemble in many respects *E. tasmanica*, Grouv., but I judge from the description of that insect that the lateral margins of its prothorax are not reflexed, which is not the case with any of the species I am now describing.

Three species of *Haptoncura* have been described from Australia by Reitter,—none of which have I seen to my knowledge. *H. imperialis*, Reitter should be unmistakeable on account of the bright sharply defined markings of its upper surface, and the other two (from the extreme North of Queensland,—a locality from which I have not seen any *Haptoncura* except *ocularis*,

Fairm.) are both said to be "*confertim punctulatæ*" which is not the case with any of the species described below.

I have been careful to refer the following descriptions to such of the characters of the species dealt with as seem to be of possibly generic value. The sculpture of the upper surface seems to fall into several rather distinct types and may be of importance,—the surface of some being very conspicuously coriaceous and in others with scarcely any indication of that peculiarity, and again in some of the species before me (*H. nelsonensis*, Blackb., *lindensis*, Blackb., *eyrensis*, Blackb., and *uniformis*, Blackb.) the puncturation of the elytra is decidedly of squamose appearance,—so that it is little visible when looked at with the head of the specimen towards the observer, but very distinct when the position of the specimen is reversed. In the other species the distinctness of the elytral punctures is not affected by the position from which it is looked at.

H. brightensis, sp. nov. Minus lata; obscure brunneo-testacea; subpubescens; capite coriaceo distincte sat crebre punctulato; prothorace quam longiori ut 3 ad 2 latiori, antice sat fortiter (ad basin ipsam parum manifeste) angustato, supra coriaceo ut caput punctulato, lateribus anguste reflexo-marginatis leviter arcuatis, angulis omnibus obtusis; scutello fere ut pronotum punctulato; elytris quam prothorax paullo latioribus et circiter duplo longioribus, coriaceis, subtilius sat sparsim punctulatis, lateribus parum arcuatis, ad apicem truncatis; metasterno postice in medio late angulatim emarginato. Long., 1 l.; lat., $\frac{1}{2}$ l.

The upper surface is indistinctly marked with some scarcely symmetrical infuscation, which is on the disc of the pronotum and (in the form of two discal blotches placed longitudinally) on each elytron; the infuscation is unnoticeable from some points of view. The labrum does not cover the mandibles,—which is inconsistent with the characters Reitter attributes to *Haptoncura*.

Victoria; mountains near Bright.

H. Sloanei, sp. nov. Lata; obscure brunneo-testacea, antennarum clava sat infuscata; subpubescens; capite subplanato coriaceo subtiliter sat sparsim punctulato; prothorace quam longiori duplo latiori, antice sat fortiter postice vix manifeste angustato, supra coriaceo et distincte sat crebre punctulato, lateribus anguste reflexo-marginatis leviter arcuatis, angulis omnibus obtusis; scutello punctulato; elytris quam prothorax vix latioribus minus quam duplo longioribus, coriaceis, minus subtiliter minus sparsim (circa scutellum fere crebre) postice subobsolete punctulatis, lateribus parum arcuatis, ad apicem truncatis; metasterno postice in medio late angulatim emarginato. Long., $\frac{9}{10}$ l.; lat., $\frac{1}{2}$ l.

Of very manifestly shorter and wider build than the preceding *(H. brightensis)* and also differing from it *inter alia* by its prothorax considerably more transverse, its head more finely and sparsely punctulate and its elytra more strongly and closely punctulate, especially in the scutellar region where the punctures are almost *crowded.* In this species the labrum covers the mandibles but I cannot attribute great importance to the character as it seems to me to depend to some extent at least on the attitude of the mandibles at the time when the specimen died. Certainly I could not separate these two generically. The upper surface of this species has some vague infuscation not unlike that of the preceding.

N.S. Wales; from Mr. T. G. Sloane.

H. nelsonensis, sp. nov. Modice lata; brunneo-testacea, abdominis segmentis intermediis infuscatis; sat pubescens; capite subtiliter vix crebre punctulato; prothorace quam longiori ut 12 ad 7 latiori, antice sat fortiter postice vix manifeste angustato, supra coriaceo et crebre (nec ullo modo confluenter) minus subtiliter punctulato, lateribus anguste reflexo-marginatis leviter arcuatis, angulis omnibus obtusis; scutello fere ut pronotum (sed paullo subtilius) sculpturato; elytris quam prothorax parum latioribus vix duplo longioribus, coriaceis, sat crebre leviter subsquamose punctulatis, lateribus parum arcuatis, ad apicem truncatis; metasterno postice in medio late angulatim emarginato. Long., 1 l.; lat., ½ l.

The elytral puncturation of this species differs from that of the preceding two species in being much less sharply defined (as in *lindensis*, Blackb., *Meyricki*, Blackb, *Victoriensis*, Blackb., and *ocularis*, Fairm.). It differs from that of the last named two in the derm on which this puncturation is placed being very distinctly coriaceous, and from that of *lindensis* in its being much closer It is more like that of *Meyricki*, but that species differs from the present one in respect of other characters,—e.g. in the puncturation of its pronotum being confluent. Such infuscation of the elytra as is present consists of a vague triangular common blotch in the scutellar region and an ante-apical cloud.

Victoria; on flowers near Nelson.

H. sparsior, sp. nov. Modice lata; obscure brunneo-testacea, antennarum clava et meso-meta-que sternis nigricantibus; subpubescens; capite coriaceo subtiliter sat sparsim punctulato; prothorace quam longiori fere duplo latiori, antice sat fortiter postice vix manifeste angustato, supra coriaceo et sparsim minus subtiliter punctulato, lateribus anguste reflexo-marginatis leviter arcuatis, angulis omnibus obtusis; scutello coriaceo sparsissime punctulato; elytris quam pro

thorax vix latioribus vix duplo longioribus, coriaceis, sat sparsim (prope scutellum paullo minus sparsim) minus subtilius punctulatis, lateribus parum arcuatis, ad apicem truncatis; metasterno postice in medio late angulatim emarginato. Long., 1 l.; lat., ⅓ l. (vix).

In my unique example of this species the mandibles are entirely covered by the labrum. Rather close to *H. Sloanei*, Blackb., but differing from it *inter alia* by the black club of its antennæ, the nearly black color of its meso- and meta-sterna (in strong contrast to the testaceous prosternum and abdomen), its evidently less transverse prothorax, and its much less closely punctured pronotum (the punctures of which even close to the front margin are separated *inter se* by more than the length of the diameter of individual punctures. There is a little vague infuscation on the elytra in the scutellar region and behind the middle, also forming a wide margin on the scutellum itself.

N.S. Wales.

H. darwinensis, sp. nov. Minus lata; obscure brunneo-testacea, meso- et meta-sternis nigricantibus; subpubescens; capite coriaceo subtiliter sat sparsim punctulato; prothorace quam longiori fere duplo latiori, antice sat fortiter postice vix manifeste angustato, supra coriaceo et sparsim (in medio disco sparsissime) subtiliter punctulato, lateribus angustissime reflexo-marginatis leviter arcuatis, angulis omnibus obtusis; scutello coriaceo sparsim punctulato, elytris quam prothorax vix latioribus circiter duplo longioribus, coriaceis, sat sparsim (prope scutellum paullo minus sparsim) sat subtiliter punctulatis, lateribus parum arcuatis, ad apicem truncatis; metasterno postice in medio late angulatim emarginato. Long., ⅘ l.; lat., ⅔ l. (vix).

This species is certainly very close to the preceding (*H. sparsior*) but I cannot regard them as identical. *H. darwinensis* is very evidently smaller than *sparsior*, of less wide build, its antennal club testaceous, its prothorax a trifle more transverse and with a narrower reflexed margin, its pronotum evidently more finely and sparsely (on the middle of the disc *extremely* finely and sparsely) punctured. It differs from *Sloanei*, Blackb., by the same characters that distinguish *sparsior* (except the colour of the antennal club). The infuscation of the upper surface is much as in *sparsior*.

Tropical Australia (Port Darwin).

H. eyrensis, sp. nov. Modice lata; brunneo-testacea; sub-pubescens; sub-nitida; vix coriacea; capite crebre punctulato; prothorace quam longiori fere duplo latiori, antice sat fortiter postice haud angustato, supra sat crebre (præsertim antice)

subtiliter punctulato, lateribus angustissime reflexo-marginatis leviter arcuatis, angulis omnibus obtusis; scutello crebrius punctulato; elytris quam prothorax vix latioribus vix duplo longioribus, ad apicem truncatis, sat crebre subtilius squamoso-punctulatis, lateribus parum arcuatis; metasterno postice fere truncato, vix (nullo modo angulatim) emarginato. Long., 1 l. (vix.); lat., $\frac{2}{5}$ l.

This species differs from all the preceding in its metasternum not being angularly emarginate behind. In this character it agrees with *H. uniformis*, Blackb. from which it differs *inter alia* in its much lighter colour and much more closely punctulate head.

S. Australia (Eyre's Peninsula).

TABULATION OF THE AUSTRALIAN SPECIES OF HAPTONCURA KNOWN TO THE WRITER.

A. Elytra with sharply defined black and yellow markings	*ocularis*, Fairm.
AA. Elytra not having sharply defined markings.	
B. Pronotum confluently punctulate	*Meyricki*, Blackb.
BB. Puncturation of pronotum not confluent.	
C. Hind margin of metasternum angularly emarginate in the middle.	
D. Pronotum closely punctulate.	
E. Puncturation of elytra not squamose.	
F. Elytra sparsely punctulate ...	*brightensis*, Blackb.
FF. Elytra much more closely punctulate	*Sloanei*, Blackb.
EE. Puncturation of elytra squamose.	
F. Sides of pronotum distinctly reflexed	*nelsonensis*, Blackb.
FF. Sides of pronotum not reflexed ...	*lindensis*, Blackb.
DD. Pronotum sparsely punctulate.	
E. Antennal club black	*sparsior*, Blackb.
EE. Antennal club testaceous	*darwinensis*, Blackb.
CC. Hind margin of metasternum very wide and nearly straight.	
D. Head sparsely punctulate	*uniformis*, Blackb.
DD. Head closely punctulate	*eyrensis*, Blackb.

CRYPTARCHA.

C. elegantior, sp. nov. Ovata: minus depressa; sat nitida; pubescens; nigro-picea, capite antice prothorace (marginibus antico et postico exceptis) elytrorum marginibus lateralibus et macula permagna communi triangulari basali antennis pedibus et pygidii lateribus rufis; capite pronotoque sat grosse sat crebre punctulatis; epistomo leviter biimpresso; prothorace fortiter transverso, antice angustato, lateribus arcuatis reflexo-marginatis, angulis posticis (superne visis) retrorsum inclinatis sat acutis, disco medio manifeste planato; elytris ad apicem truncatis, sat fortiter punctulato-striatis,

striis latera versus obsoletis (subsuturali profunda ad basin continua), interstitiis sat angustis sat planis (sed 2° manifeste, 3° vix, antice convexis). Long., 1⅔ l.; lat., ⅔ l.

There are about eleven punctulate striæ on each elytron, outside of which the sculpture becomes vague and the puncturation scarcely seriate,—the external of the eleven striæ becoming successively feeble. The evident convexity of the second interstice a little behind the base is suggestive of *C. depressa*, Grouv., from which the present species differs *inter alia multa* by the very much coarser puncturation of its head and pronotum, the absence of a defined keel on the pronotum, the much stronger elytral striæ, the continuity to the base of the subsutural stria, and the very slight convexity of the second elytral interstice. The elytral interstices in general though nearly flat are less decidedly so than in *depressa*. The red common triangle on the elytra has its base on the base of the elytra and its apex about the middle of the suture.

Victoria (Dividing Range and Alps).

C. subnigella, sp. nov. Ovata, postice sat fortiter angustata; minus depressa; sat nitida; pubescens; supra nigra, nonnullorum exemplorum prothoracis lateribus et elytrorum apice summo subrufescentibus, corpore subtus piceo, antennis mandibulis pedibusque rufis; capite pronotoque sat grosse sat crebre punctulatis; epistomo leviter biimpresso; prothorace fortiter transverso, antice angustato, lateribus arcuatis vix reflexo-marginatis, angulis posticis (superne visis) retrorsum inclinatis sat acutis, disco longitudinaliter carinato; elytris ad apicem truncatis, sat fortiter punctulato-striatis, striis latera versus bene definitis sed in parte humerali obsoletis (subsuturali profunda ad basin continua), interstitiis angustis subcariniformibus. Long., 1½ l.; lat., $\frac{7}{10}$ l.

Agrees with the preceding in the presence on its elytra of a strong entire subsutural stria. There are about 14 striæ on the elytra of this species in front (with a wide non-striate but strongly punctulate interval between the eleventh and twelfth striæ),—those near the suture and lateral margins being the most strongly impressed; only about 12 striæ cross the *middle* of the elytra, the second, third and fourth becoming obsolete about the middle, and the (in front broad) interval between the eleventh and twelfth striæ narrowing behind into an additional stria. Of the interstices the first in its front part is the most strongly cariniform, the second, third, and fourth are decidedly though very finely cariniform, the fifth and eleventh indistinctly (except from certain points of view) and extremely finely cariniform, the

lateral two or three strongly so. Resembles the preceding *(C. elegantior)* in the coarse puncturation of its head and prothorax but differs from it *inter alia* very widely in coloring, also in the presence of a comparatively strong longitudinal carina on the pronotum, and the details of the elytral sculpture. A small brown *Cryptarcha* less narrowed behind (from the same region) appears to me to be a starved immature example of this insect, but may represent a distinct species.

Victoria (Northern Mountains).

COLYDIIDÆ.

PHORMESA.

P. Carpentariæ, sp. nov. Sat depressa; sat opaca; piceo-nigra, capite antice pronoti lateribus elytris (basi fascia lata mediana apice et maculis nonnullis parvis piceis exceptis) antennis pedibusque rufo testaceis; prothorace transverso, ab apice retrorsum leviter angustato, supra confertim subtiliter aspero, utrinque bicostato, costis exterioribus integris (interioribus prope marginem anticum introrsum subito versis et hic inter se fere conjunctis, postice introrsum sic ut laquea singula formant versis), lateribus fere rectis sat anguste reflexo-marginatis subtilius crenulatis, angulis anticis fortiter productis sat acutis posticis obtusis; elytris singulis 5-carinatis, interstitiis grosse biseriatim punctulatis. Long., $1\frac{3}{5}$ l.; lat. $\frac{1}{2}$, l.

Remarkably suggestive of the European *Ditoma crenata*, Hbst., in color and markings. I think it should be placed in *Phormesa*, but it seems to incline towards *Ditoma*, its antennary furrows being very feeble, and the reflexed margin of its pronotum distinctly narrow.

Queensland (Mr. Koebele, Cairns).

TODIMA.

T. lateralis, sp. nov. Elongata, postice sat angustata; parum convexa; minus nitida; parce pubescens; rufula, capite et pronoti elytrorumque disco infuscatis; capite subquadrato, antice bifoveolato, confertim subtiliter ruguloso punctulato; prothorace transverso, supra ut caput sculpturato, ad latera latius (quam *T. fuscæ*, Grouv. et *rufulæ*, Grouv. perspicue magis late) explanato, disco depresso, utrinque substriato, striis antice et postice incurvatis, lateribus fere rectis, angulis anticis subacutis posticis fere rectis; elytris quam prothorax parum latioribus, punctulato-striatis, interstitiis sat planis (7° subcariniformi, elytris extra hoc sat abrupte declivibus). Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{2}$ l.

My two specimens of this insect differ considerably from each other in color,—one being considerably darker than the other on both the upper and under surface. The species is rather close to *T. rufula*, Grouv., its most conspicuous difference being in the form of the prothorax,—the sides of which are almost straight, with the lateral edging very distinctly wider and evidently explanate.

Victoria (in *Xanthorrhœa*, near the mouth of the Glenelg River).

PSEUDEBA (gen. nov. *Colydiidarum.*)

Caput transversum antice profunde emarginatum ad clypeum recipiendum; antennæ breves, crassæ, basi tectæ, 11 articulatæ (articulo basali minuto ceteris gradatim magis transversis, apicali brevi minus lato); palporum maxillarium articulo ultimo elongato-conico, oculi grosse granulati, superne vix manifesti; prothorax transversus, basi angustatus; elytra elongata, quam prothorax circiter duplo longiora; tibiæ modice latæ, ad apicem calcaratæ; prosternum antice profunde emarginatum, ante coxas breve; coxæ anticæ inter se sat anguste divisæ, intermediæ fere contiguæ, posticæ vix late divisæ; segmentum ventrale basale quam 2um haud (quam 3um manifeste) longius, antice inter coxas sat angustum; tarsi 4-articulati, breves, sat crassi, articulis 1—3 inter se sat æqualibus (4° quam ceteri conjuncti vix breviori); corpus glabrum, sat opacum, alatum, sat convexum.

The obscure little insect for which I propose this name is evidently allied to the species mentioned in Trans. R.S., S.A., 1902, p. 318 as being probably *Eba cerylonoides*, Pasc. The curious antennæ of the two are extremely similar, but whereas in the present species there is certainly a minute basal joint (making the number of joints 11) I cannot detect any such joint in the other. The character that seems to me most distinctive of this genus is the very strong emargination of the front of the prosternum which causes the front margin of the prosternum to be considerably nearer to the coxæ than is usual in the *Colydiidæ*. I am afraid I must say of it,—as Pascoe said of *Eba*,—"for the present its affinities must be left in doubt," but there seems no other family than the *Colydiidæ* in which it could possibly be placed. It should be added that the position of the clypeus in a deep emargination of the front is a distinctive character and the same may be said of the eyes scarcely visible except when viewed from below,—which is however the case with some other *Colydiidæ* (e.g., *Deretaphrus*,—especially *D. Erichsoni*, Newm.). In general appearance this insect is not very like any other known to me,—

perhaps on a casual inspection a place not far from *Deretaphrus* would be thought of,—but many of its characters are quite inconsistent with such a place; and in Lacordaire's classification it would have to stand in the *Synchitides*.

P. novica, sp. nov. Sat elongata, pos tice angustata; ferruginea; capite prothoraceque supra crebre minus fortiter punctulatis; hoc transverso, æquali, lateribus antice leviter arcuatis, circiter medium subangulatis (hinc ad basin subsinuatim convergentibus), angulis anticis vix productis posticis acute rectis, margine antico supra fere recta quam basis manifeste latiori, hac fere recta; scutello sat magno, transverso; elytris vix manifeste punctulatis, costulis circiter 8 (his nonnihil arcuatis) subtilibus ornatis. Long., $1\frac{2}{5}$ l.; lat., $\frac{1}{2}$ l.

It will be noticed that the outline of the prothorax resembles that of *Deretaphrus*, but the segment is quite strongly transverse. The fine elevated lines on the elytra are slightly arched (the extremities of each inclined outward).

Queensland; Townsville (from Mr. F. P. Dodd).

DERETAPHRUS.

This genus seems to be very numerous in species although a comparatively small number have been described. Its species are closely allied and more or less variable,—especially in respect of size. Before describing new species it seems desirable to make some remarks on those already named. In Masters' Catalogue 11 species are enumerated, and Mr. Lea has since described four species. *D. puteus*, Newm., has been shown to be a *Bothrideres* (Journ. Ent. I., p. 460) and *D. granulipennis*, Reitt. is (see below) identical with *Erichsoni*, Newm. *D. Wollastoni*, Newm., is probably not a *Deretaphrus*; at any rate it is very different from any species before me, its pronotum being described as having a median depression on the basal half and on either side a carina extending from the hind angle of the pronotum straight forward (not following the lateral margin) towards the front of the segment. This reduces the number of valid *Deretaphri* to 12. On seven of these I remark as follows. *D. Pascoei*, Macl. is not recognisable by the description which would fit several species (e.g. *fossus*, Newm. and *ignarus*, Pasc.); as it is from Queensland (from which place I have not seen any *Deretaphri*) it is,—if a valid species,—not likely to be before me. *D. analis*, Lea, is described as having its upper surface "almost impunctate;" it also is from a locality (Northern N. S. Wales) very remote from those of the *Deretaphri* I have examined, and none of them approaches Mr. Lea's insect in respect of the character I have mentioned. *D. xanthorrhœæ*, Lea, and *parviceps*, Lea (both from W. Australia) are not described as in the least

like the one species from W. Australia that I have seen. *D. ignarus*, Pasc. (from Sydney) is said to have elytral interstices much less distinctly punctured than those of *D. fossus*, Newm.; I have not seen any *Deretaphrus* (that comes near fitting the description of *ignarus*) in which that character is apparent, nor any at all from the Sydney region; Mr. Lea has sent me a *Deretaphrus* from Forest Reefs under the name *ignarus*, but as its elytral interstices are quite as strongly punctulate as in *fossus* I cannot think it rightly named. *D. colydioides*, Pasc. may possibly be a Victorian species before me, but it is too vaguely described for confident identification.

The most reliable and tangible characters for distinguishing the species of *Deretaphrus* seem to me to be those of the pronotum, and I divide the genus into three main groups founded on the puncturation of that organ. In the first of these the punctures are extremely fine and sparse (as in *D. piceus*, Germ). In the second the punctures are still very sparse and decidedly fine, but not nearly so fine as in *piceus*. In the third group they are comparatively coarse and close (not much different from those of *D fossus*, Newm.). Another valuable character is found in the structure of the carina and stria which form the division between the pronotum and prosternum. These do not, in any *Deretaphrus* known to me, reach the front margin of the segment, but cease at an interval from that margin which differs in different species; in some species moreover, they end by becoming gradually feebler and when that is the case the front angles of the segment (viewed from above) seem very obtuse or even non-existent, while in other species they end abruptly and in that case their terminus (viewed from above) has the appearance of being a well-defined front angle of the segment from which the apparent apical margin projects forward (with a convex front outline) towards the head. It is to be noted, however, that the terminus of the lateral carina is in no species *really* at the true front corner of the pronotum. In most of the existing descriptions of *Deretaphri* a good deal of emphasis has been laid upon the carination of the elytral interstices. So far as my observation goes it is not a satisfactory character for exact definition. In all species known to me of the genus the alternate interstices become carinate (or more strongly carinate) near the apex and undoubtedly the tendency of this carination to begin nearer to (or even *at*) the base seems characteristic of species. Nevertheless, specimens of the same species (at any rate, specimens taken in company and *apparently* of one species) seem to differ a little *inter se* in this respect, Moreover, in general the degree of convexity of the interstices looks different from different points of view. Among the considerable number of *Deretaphri* in my

collection, only one species has the third interstice of the elytra genuinely carinate (i.e. its summit a sharp keel-like edge) throughout its length, though there are a good many species in which it is "raised" or "convex" throughout.

Unfortunately there is a doubt (it seems to me) as to which of the *Deretaphri* is *fossus*, Newm.,—the type of the genus. If Newman's expression "elytron utrumque 4-carinatum" is taken strictly (i.e. as meaning that the alternate interstices are entirely carinate as distinguished from merely convex) there is only one species before me that could possibly be *fossus*,—and it is evidently the species that Pascoe calls *fossus*. It however is of a pitchy-black color, whereas according to Newman the color is "fuscus." This would seem to be a small difficulty were it not that Pascoe has described a species (*ignarus*) the description of which equally agrees with Newman's description independently of color and also agrees in color (calling it "obscure rufo-fuscus"). Pascoe distinguishes the species thus "*fossus* is pitchy black, with the elytral interstices punctured; *ignarus* is dark rufo-fuscous with the elytral interstices all but unpunctured." As the interstices of the elytra (in the sense in which Pascoe uses the term) are not even mentioned in Newman's very brief description there certainly seems to be a doubt whether *ignarus*, Pasc., may not be the true *fossus*. Nevertheless the *probability* seems in favour of Newman having had before him a somewhat unusually colored specimen of the species that Pascoe calls *fossus*, inasmuch as it is much the commoner species (at any rate in the localities from which Newman obtained most of his Australian *Coleoptera*). This insect is common in Victoria and may be recognised by the following characters from all its congeners described, or known to me; color pitchy black (opaque), the legs and undersurface a little reddish; pronotum closely and strongly punctulate, with a dorsal channel reaching from close to the base to about the middle of the segment, beyond which is a vague but fairly deep depression; the elytra with shoulders strongly produced, their alternate interstices and also the sixth continuously carinate (i.e. their summit shining and knife-edge-like), all the interstices quite distinctly (though very finely and sparsely) punctulate: the (apparent) front angles of the prothorax very little marked though more distinct than in some species (e.g. *D. piceus*, Germ.).

D. thoracicus, sp. nov. Sat angustus; sat elongatus; modice nitidus; piceus, antennis pedibusque plus minusve rufescentibus. capite fortiter convexo, subtilius sat crebre punctulato; prothorace quam latiori ut 7 ad 5 longiori, sparsim subtilissime punctulato, profunde canaliculato (canali basin fere apicem nullo modo attingenti, ante medium interrupto), ad quasi-apicem quam ad mediam partem vix angustiori,

lateribus a quasi-apice ad medium subrectis fere parallelis hinc ad basin fortiter sinuatis, angulis anticis (superne visis) late obtusis sed sat bene determinatis posticis valde obtusis (ad apicem summum vix subdentiformibus), carinæ lateralis apice a segmenti margine antico late (circiter oculi diametro) distanti, parte basali utrinque foveata; elytris punctulato-striatis (striis subsuturalibus 2 subtiliter, ceteris sat grosse, punctulatis), interstitiis alternis convexis (3° ad basin et apicem, 5° 7° que totis, cariniformibus alternis vix convexis (omnibus fere impunctulatis), humeris prominentibus. Long., 5 l.; lat., $1\frac{1}{10}$ l.

This species is extremely close to *D. piceus*, Germ., indeed the only differences that I can specify are in the greater convexity of the head between the eyes and in the form of the prothorax,—but the latter is so strongly marked that I cannot but consider it specific. Viewed from above the apparent front margin of the pronotum (closely examined it is seen to be not the true front margin but the interval between the apices of the lateral carinæ of the segment) joins the lateral margin by a very open but quite distinct angle from which the sides of the segment are straight and parallel to the middle of their length; whereas in *piceus* (viewed from above) the apparent front margin is the real one and the front angles appear quite rounded off, the sides of the segment diverging in a curve from the front to the middle so that at its middle the prothorax is considerably wider than in front. The form of the quasi-front margin of the pronotum in *D. thoracicus* is almost exactly as in *D. fossus*, Newm., but in that species the sides are different (converging in a curve hindward, so that the width of the segment across the middle is notably less than across the quasi-front angles). I have examined a considerable number of South Australian examples (and a few Victorian) of *D. piceus* and find no variation whatever in the form of the prothorax.

Victoria, Glenelg River district.

D. Bakewelli, Pasc. If my identification of this insect (which I have from N.S. Wales, Victoria, and Tasmania) is correct (about which I have little doubt) it is even closer to *D. piceus* than is *D. thoracicus;* nevertheless, I believe it to be a valid species. All the examples that I have seen are of a dark ferruginous colour (certainly not due to immaturity) and are evidently more nitid than examples of *piceus*; the prothorax, too, is a little narrower behind and (therefore) with its sides a little more strongly rounded. Unless I am uniting two species under this name *D. Bakewelli* varies extremely in size, one example from the Victorian mountains being less than 3 lines long, while the largest (from N.S. Wales) is more than 5 lines. The

smaller examples seem of more slender build than the larger ones with the sides of the prothorax a trifle more strongly rounded. It is quite possible that the collection of numerous specimens of each form taken in company might establish their distinctness.

D. gracilis, sp. nov. Angustus; elongatus; sat nitidus; obscure ferrugineus; capite pronotoque fere ut præcedentis *(D. thoracici)* sed hoc magis fortiter nec magis crebre punctulato, lateribus minus fortiter marginatis et ante medium magis arcuatis, angulis posticis multo minus late obtusis; elytris seriatim fortiter punctulatis (serie subsuturali in stria sat manifesta impressa), interstitiis subtilissime sat perspicue punctulatis omnino (3° prope basin apicemque et 5° 7° que totis leviter subcariniformibus exceptis) planis. Long., 3½ l.; lat., $\frac{7}{10}$ l. (vix).

This is a very isolated species of *Deretaphrus*,—the most decidedly nitid known to me and differing from all others that I have seen in the inner four of the interstices of its elytra (except the third close to the base and near the apex) being absolutely flat, the second, third, and fourth rows of punctures being mere isolated impressions on an even surface. The pronotum is so much like that of the preceding species that it seems unnecessary to repeat the details of its description, and sufficient to say that the description of the pronotum of *thoracicus* describes that of the present species with the qualifications noted above. The two previously known W. Australian species of *Deretaphrus* (neither of which I have, to my knowledge, seen) are described as having the third interstice keel-like.

W. Australia.

D. iridescens, sp. nov. Sat elongatus; sat angustus; sat nitidus (præcipue in pronoto); obscure ferrugineus, pronoto manifeste cæruleo-micanti; capite subtilius sat crebre punctulato; prothorace quam latiori ut 6 ad 5 longiori, supra sparsim vix subtiliter punctulato, subdepresso, profunde canaliculato (canali basin fere apicem nullo modo attingenti, ante medium interrupto, parte antica perparva), ad quasi-apicem quam ad mediam partem parum angustiori, lateribus a quasi-apice fere ad basin sat æqualiter arcuatis hinc ad basin sinuatis, angulis quasi-anticis (superne visis) late obtusis posticis sat obtusis sed ad apicem summum dentiformibus, carinæ lateralis apice a segmenti margine antico late (circiter oculi diametro) distanti, parte basali utrinque transversim impressa; elytris punctulato-striatis (striis suturalibus 2 subtiliter, ceteris sat grosse, punctulatis), interstitiis alternis leviter convexis (3° ad basin et apicem, 5° 7° que totis, subcariniformibus) alternis sat planis (omnibus vix perspicue

punctulatis), humeris parum prominentibus. Long., $3\frac{2}{3}$ l.; lat., $\frac{1}{3}$ l.

This species forms with the preceding a small group that differs from the *piceus* group by its evidently more,—and from the *fossus* group by its evidently less,—strongly punctulate pronotum. It differs from all the other *Deretaphri* known to me by the front part of the lateral outline of its prothorax forming a regular curve which passes into the posterior sinuation evident[1]-further back (i.e. nearer the base) than in the other species.

S. Australia (Adelaide district).

D. cordicollis, sp. nov. Elongatus; sat angustus; minus nitidus; piceus, femoribus magis rufescentibus; capite longitudinaliter leviter impresso, crebrius minus subtiliter punctulato; prothorace quam latiori parum longiori, supra sat crebre sat fortiter (quam *D. fossi*, Newm., vix minus fortiter) punctulato, profunde canaliculato (canali basin fere apicem sat prope attingenti, circiter medium interrupto, parte antica magna minus concinne definita), ad quasi-apicem quam ad mediam partem sat latiori, lateribus a quasi-apice ad medium leviter arcuatis hinc ad basin valde sinuatis, angulis quasi-anticis bene determinatis fere subacutis posticis leviter obtusis sed ad apicem summum sat fortiter dentiformibus, carinæ lateralis apice a segmenti margine antico minus late (oculi diametri circiter dimidio) distanti, parte basali utrinque late leviter impressa; elytris punctulato-striatis, interstitiis alternis (3° in parte media magis obtuso excepto) cariniformibus alternis (6° in parte subapicali cariniformi excepto) vix convexis (omnibus perspicue punctulatis), humeris modice prominentibus. Long., $5\frac{2}{3}$ l.; lat., 1 l.

The close and comparatively strong puncturation of its pronotum associates this insect with the *fossus* group of species. From the species which I have indicated above as being in my opinion *fossus* the present one differs *inter alia (a)* in respect of its pronotum by the much more sharply defined quasi-front angles (a character which separates it also from all the other hitherto described *Deretaphri* known to me) the much larger and deeper front part of the longitudinal channel (which however is of the same foveiform character as in *fossus)*, the evidently (though not very much) finer puncturation, the stronger lateral sinuation, the considerably more strongly dentiform apex of the hind angles, the much nearer-approach of the lateral carina to the front margin of the segment; *(b)* in respect of its elytra by the third interstice being in the middle part of its length obtusely convex rather than cariniform, by the sixth interstice being cariniform only in a short space a little behind the middle, by

the shoulders being much less prominent; *(c)* in respcet of the head by the presence of a distinct (though not strongly defined) longitudinal impression.

A much smaller specimen (Long., 3¾ l.) of a ferruginous red color which I took near the summit of one of the higher Victorian mountains does not seem to differ much from this species, —the hind angles of its prothorax, however, being a little more strongly obtuse and less strongly dentiform at extreme apex and the third interstice of its elytra being non-cariniform for a considerably greater proportion of its length. It is probably a valid species, but more specimens of both forms ought to be examined before this Victorian insect is described as distinct.

Tasmania.

D. popularis, sp. nov. Sat elongatus; modice angustus; minus nitidus; nigro-piceus, antennis pedibus et corpore subtus nonnihil rufescentibus; capite longitudinaliter leviter impresso, crebre subfortiter punctulato; prothorace quam latiori ut 8 ad 7 longiori, supra crebre sat fortiter (ut *D. fossi*, Newm.) punctulato, profunde canaliculato (canali basin fere apicem nullo modo attingenti, paullo ante medium interrupto), ad quasi-apicem quam ad medium vix angustiori lateribus a quasi apice ad medium parum arcuatis hinc ad basin modice sinuatis, angulis quasi-anticis bene determinatis obtusis posticis sat obtusis ad apicem summum vix dentiformibus, carinæ lateralis apice a segmenti margine antico sat late (quam oculi diametro paullo minus late) distanti, parte basali utrinque late subobsolete impressa; elytris punctulato-striatis, interstitiis alternis (3° in parte mediana fere plano excepto) cariniformibus alternis (4° 6° que obsolete convexis exceptis) fere planis (omnibus minute punctulatis) humeris vix prominentibus. Long., 4 l.; lat. 1 l. (vix).

I do not find any very salient single character in this species to separate it from its congeners. It is nearest, I think, to the Adelaide insect which I have no doubt is *viduatus*, Pasc. and which is notable for the almost flat surface of the middle part of the third interstice of its elytra. The present species agrees with *viduatus* in that respect (and most others) but differs widely in the form of its prothorax, the lateral margin of which reaches evidently nearer to the true front margin of the segment, and the quasi-front margin of which resembles that of *Erickxoni*, Newm. but with the quasi-front angles still more pronounced and the distinction between the true and the apparent front margin much less observable from above,—in fact (as is the case also in *D. thoracicus*) scarcely discoverable except when looked at from

the side. In *D. viduatus* the portion of the outline corresponding to the quasi-front angles of *D. popularis* is so rounded off that no quasi-front angles appear, and therefore no other front margin than the true one being observable, the segment presents the appearance of being (as it *really* is in all the *Deretaphri*) very little wider across the front margin than the base.

Australia (I am not sure of the exact habitat but believe it to be the Victorian Mountains.).

D. æqualiceps, sp. nov. Sat elongatus; angustus; sat nitidus; rufo-ferrugineus; capite convexo, æquali (nullo modo impresso), sat crebre minus fortiter punctulato; prothorace quam latiori ut 7 ad 6 longiori, supra crebre minus profunde punctulato, aliter fere ut præcedentis (*D. popularis*) sed foveis subbasalibus majoribus profundioribus; elytris fere ut præcedentis sed interstitio 3° in parte discoidali sat fortiter convexo-elevato (fere subcariniformi). Long., $3\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l. (vix.).

In the group of *Deretaphri* having the pronotum closely punctulate and its sulcus interrupted this species is readily distinguished by the perfectly even surface of its head which has no inequalities whatever. It also differs from them *inter alia* as follows,—from *fossus*, Newm. by its very much less prominent shoulders, from *cordicollis*, Blackb. by the non-cariniform sixth interstice of its elytra, from *popularis*, Blackb. by the much more convex third interstice of its elytra, from *colydioides* Pasc. (?) and indeed all the others not already mentioned,—by the very much more strongly defined quasi-front angles of its prothorax.

Victoria (Dividing Range).

D. sparsiceps, sp. nov. Sat elongatus; sat angustus; minus nitidus; piceus; capite sat sparsim punctulato, ad suturam clypealem mediam impresso; prothorace quam latiori ut 8 ad 7 longiori, sat crebre sat fortiter (quam *D. fossi*, Newm., minus crebre fere magis fortiter) punctulato, profunde canaliculato (canali basin fere apicem nullo modo attingenti, circiter medium interrupto, parte antica elongata) ad quasi-apicem quam ad medium haud angustiori, lateribus a quasi-apice ad medium vix arcuatis hinc ad basin fortiter sinuatis, angulis quasi-anticis male definitis (late obtusis) posticis subrectis ad apicem summum minute dentiformibus, carinæ lateralis apice a segmenti margine antico late (circiter oculi diametro) distanti, parte basali utrinque depressa; elytris punctulato-striatis, interstitiis alternis quam cetera vix (ad apicem magis fortiter, 5° toto leviter subcariniformi, exceptis) magis convexis alternis subplanis (omnibus subtiliter punctulatis), humeris vix prominentibus. Long., $4\frac{1}{5}$ l.; lat., $\frac{1}{5}$ l.

This species has the quasi-front angles of its prothorax extremely obtuse (as in *fossus*, Newm.), the true lateral margins of the segment converging forward from them much less strongly than in the three preceding species so that there is a much longer piece of the pronotum in front of them; they are, however, quite distinctly angles and not rounded off as they are in the species that I take to be *viduatus*, Pasc. The elytral sculpture is much like that of the latter species from which however it is readily distinguished not only by the better defined quasi-front angles of the prothorax, but also by the very much less close puncturation of the head.

S. Australia (Eyre's Peninsula).

D. cribriceps, sp. nov. Elongatus; angustus; minus nitidus; piceus, antennis pedibusque obscure rufescentibus; capite creberrime strigatim subrugulose punctulato, ad suturam clypealem mediam impresso; prothorace quam latiori ut 6 ad 5 longiori, crebre fortiter (ut *D. fossi*, Newm.) punctulato, ut præcedentis *(D. sparsicipitis)* canaliculato, ad quasi-apicem quam ad medium perspicue angustiori, lateribus a quasi-apice ad medium manifeste arcuatis hinc ad basin sat fortiter sinuatis, angulis quasi-anticis rotundatis posticis leviter obtusis ad apicem summum dentiformibus, carinæ lateralis apice a segmenti margine antico late (circiter oculi diametro) distanti, parte basali utrinque transversim impressa; elytris punctulato-striatis, interstitiis alternis (3° in parte mediana excepto) cariniformibus alternis parum convexis (omnibus minus perspicue punctulatis), humeris vix prominentibus. Long., 4 l.; lat., $\frac{7}{10}$ l.

This species differs from all the preceding (of the group having the pronotum closely punctured) by the lateral outline being rounded at the part where they have the angles that I have called the quasi-front angles of the pronotum. In this respect it agrees with *D. viduatus*, Pasc., from which it differs *inter alia* by the third interstice of its elytra being cariniform at the base as well as the apex, and by the sculpture of its head, closer and quite evidently rugulose and not longitudinally sulcate in the front part; the unique type moreover is much smaller than any specimen of *viduatus* that I have seen. The obsolete puncturation of the elytral interstices is suggestive of *ignarus*, Pasc., but the brief description of that species implies that the third interstice of the elytra is entirely cariniform, and represents the insect as differently colored and much larger. There is little in the description of *D. colydioides*, Pasc., to distinguish that species from the present one as it is an extremely short and vague description, but it indicates *colydioides* as very much smaller, and

remarkable for its cylindrical form; and I do not find any very noticeable difference in form between this and other species.

Victoria (taken by Miss Waterhouse near Ballarat).

D. viduatus, Pasc. I have several examples taken near Adelaide (the original locality) which agree with Pascoe's brief description and are no doubt the species to which he gave this name. It is near the preceding *(D. cribriceps)* but differs as specified above. Its head is evidently larger than that of *cribriceps* and is non-rugulosely and less closely punctulate, with a well marked longitudinal median impression traversing the clypeus and produced hindward more or less behind the clypeal suture. Pascoe's brief description does not refer to the third interstice of the elytra in particular, merely saying that the interstices near the suture are not raised except at the apex and base. In a short note following the description, however, it is stated that the third interstitial line is not prominent. The fact is that of the nearest four interstices to the suture none are distinctly raised anywhere except the third, which is quite strongly cariniform in about its apical one-fifth and is evidently convex close to the base, becoming cariniform on the basal declivity of the elytra.

D. granulipennis, Reitt. This name is evidently a synonym of *D. Erichsoni*, Newm., the description of which was clearly unknown to Reitter, inasmuch as he says that his species differs from all those previously described in having the sulcus of the pronotum continuous,—while Newman had attributed that character to *Erichsoni*. A comparison of the descriptions is quite conclusive as to their having been founded on a single species. I believe this synonymy has not been previously noted.

The following is a tabular statement of the distinctive characters of the *Deretaphri* known to me :—

A. The sulcus of the pronotum deep and sharply defined.
  B. Pronotum excessively finely—almost invisibly—punctulate.
    C. Sides of prothorax rounded in front half.
      D. Nigro-piceous, subopaque; prothorax less narrowed at base ... ... *piceus*, Germ.
      DD. Fuscous-red, nitid; prothorax more narrowed at base ... . *Bakewelli*, Pasc.
    CC. Sides of prothorax straight and subparallel in front half ... ... *thoracicus*, Blackb.
  BB. Pronotum notably more strongly (but still sparsely and finely) punctulate.
    C. Inner 4 interstices of the elytra absolutely flat (except third close to base and apex) ... *gracilis*, Blackb.
    CC. Inner 4 interstices of elytra very evidently not flat ... ... *iridescens*, Blackb.
  BBB. Pronotum strongly and closely punctulate.
    C. The third interstice of the elytra genuinely cariniform throughout (shoulders strongly produced).

D. Elytral interstices distinctly punctulate ... *fossus*, Newm.
DD. Elytral interstices scarcely visibly punctulate ... . *ignarus*, Pasc.
CC. The third interstice of the elytra not cariniform except near base and apex.
D. Quasi-front angles of prothorax well defined.
E. The sixth elytral interstice strongly cariniform in part of its hind half ... ... *cordicollis*, Blackb.
EE. The sixth elytral interstice not cariniform.
F. Middle of region of elypeal suture deeply impressed ... ... *popularis*, Blackb.
FF. Surface of head quite evenly convex ... *æqualiceps*, Blackb.
DD. Quasi-front angles of prothorax quite rounded off.
E. Head sparsely punctulate ... ... *sparsiceps*, Blackb
EE. Head c osely punctulate.
F. Clypens even ... ... *cribriceps*, Blackb.
FF. Clypens longitudinally sulcate ... *viduatus*, Pasc.
AA. The sulcus of the pronotum vaguely defined and shallow ... ... *Ericksoni*. Newm.

PYCNOMERUS.

This genus is regarded by Dr. Sharp as inseparable from *Penthelispa*, which Pascoe founded for species admittedly congeneric with *P. fuliginosus*, Er. There is no need to discuss here the correctness or otherwise of Dr. Sharp's pronouncement inasmuch as Pascoe appears to be clearly in error in regarding the European *Cerylon terebrans* as the type of *Pycnomerus*. Under the diagnosis of *Pycnomerus* Erickson states that he divides the genus into three sections the first of which consists (he says) of species having eleven-jointed antennæ, the second of species having antennæ ten-jointed, and the third eight-jointed; and then follows the description of *P. fuliginosa*. This evidently implies that the first section is to be treated as the typical one and it is difficult to understand why Pascoe regarded the second section as the typical one and proposed a new name for the first.

P. politus, Lea. Mr. Lea has been good enough to send me some specimens of this insect. An example of it from Queensland had been sent to me previously by M. Grouvelle as *P. secutus*, Pasc. I am of opinion that M. Grouvelle's identification is incorrect, for although Pascoe's description is much too brief to allow of certainty I have a species from Victoria (Pascoe's locality) which agrees better with the description of *secutus*. Mr. Lea's insect, however, seems to me to be probably the same species that Mr. Olliff ("Insects of Lord Howe Island," p. 10) mentions as occurring in Queensland and refers to *P. longulus*, Shp.,—a New Zealand insect. Unfortunately Olliff gives no authority for his reference and very strong authority would be required to establish its correctness. Dr. Sharp's description of *longulus* (like Pascoe's of *secutus)* is too brief to be of much value. This species therefore must be regarded as needing

further elucidation, but I think it most probable that Lea's name will stand.

P. obscurus, Pasc. This name seems to be without doubt a mere synonym of *P. fuliginosus*, Er. The two descriptions are almost in the same words. Pascoe must have overlooked Erickson's species, since if he had known it he could hardly have omitted to specify the characters by which he considered his species to differ from it. I have taken in Tasmania (Erickson's locality) and Victoria (Pascoe's locality) numerous examples which are evidently of but one species and which agree well with both descriptions. The pronotum varies slightly in the distinctness of its dorsal impressions and also in the sinuation of its sides, but the variations seem to occur equally among Tasmanian and Victorian specimens. I think this synonymy has not been previously noted.

P. robusticollis, sp. nov. Minus angustus; minus nitidus; sparsissime vix perspicue pubescens; nigro-piceus; capite crebre rugulose subgrosse punctulato, antice profunde bifoveolato; antennis crassis brevibus; prothorace leviter transverso, supra ut caput (quam *P. fuliginosi*, Er., multo magis profunde) punctulato, fovea magna subquadrata profunda (hac intus certo adspectu bifida) impresso, postice leviter angustato, lateribus sat rectis, angulis anticis prominentibus sat acutis posticis obtusis bene determinatis, margine antico fortiter sinuato; elytris fortiter crenato-striatis, interstitiis planatis seriatim punctulatis. Long., $2\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l.

This species is near *P. fuliginosus*, Er., but very distinct from it, differing *inter alia* by its very evidently stouter antennæ, its prothorax distinctly wider than long and having *obtuse* hind angles, its head and pronotum much more deeply punctulate. The dorsal excavation of its pronotum is considerably deeper and more defined than that of any example I have seen of *P. fuliginosus*, Er. Viewed obliquely from behind, the excavation has much the appearance of the front excavation of *Bothrideres equinus*, Pasc.; viewed obliquely from in front it is seen to be divided into two sulci by a longitudinal convexity. Behind the middle of the base of the excavation is a shining unpunctured space much larger than that in any specimen that I have seen of *fuliginosus*.

Victoria.

P. interstitialis, sp. nov. Modice angustus; sat opacus; sparsissime vix perspicue pubescens; piceus, antennis pedibusque nonnihil rufescentibus; capite sat crebre sat rugulose nec profunde (ut *P. fuliginosi*, Er.) punctulato, antice profunde bifoveolato; antennis minus crassis (quam *fuliginosi* gracilioribus); prothorace quam latiori vix longiori, supra fere

ut caput sed paullo magis profunde punctulato, longitudinaliter in dorso leviter biimpresso, postice vix angustato, lateribus sat rectis, margine antico vix sinuato, angulis anticis haud prominentibus posticis leviter obtusis (fere rectis); elytris fortiter crenato-striatis, interstitiis angustissimis perspicue (nec alte) cariniformibus haud perspicue punctulatis. Long., $1\frac{3}{5}$ l.; lat., $\frac{1}{2}$ l.

The interstices of the elytra very narrow (fine cariniform lines) in themselves abundantly distinguish this species from the two previously described Australian *Pycnomeri (fuliginosus* and *robusticollis)* of the subopaque group.

Tasmania.

P. sulcicollis, sp. nov. Modice angustus; sat opacus; sparsim minus perspicue pubescens; obscure ferrugineus; capite sat crebre sat rugulose nec profunde (ut *P. fuliginosi*, Er.) punctulato, antice profunde bifoveolato; antennis (ut *fuliginosi*) sat crassis; prothorace quam latiori vix longiori, supra fere ut caput sed paullo magis profunde punctulato, in dorso longitudinaliter vix perspicue impresso, transversim paullo ante medium arcuatim sulcato (sulco ad medium obsoleto), postice leviter angustato, lateribus crenulatis antice sat arcuatis hinc retrorsum fortiter sinuatis, margine antico vix sinuato, angulis anticis haud prominentibus posticis fortiter obtusis sed ad apicem summum minute dentiformibus; elytris sat fortiter crenato-striatis, interstitiis angustissimis perspicue (nec alte) cariniformibus haud perspicue punctulatis. Long., $1\frac{7}{10}$ l.; lat., $\frac{1}{2}$ l.

The sculpture of its pronotum widely separates this species from all the previously described Australian *Pycnomeri*. That segment is slightly flattened dorsally with no well defined inequalities except an arched transverse sulcus slightly in front of the middle of the segment—the sulcus very faint in the middle and deep in the lateral region. The insect appears to be a genuine *Pycnomerus*. It is the most decidedly opaque species known to me of the genus.

Victoria (Dividing Range).

TABULATION OF CHARACTERS OF THE DESCRIBED AUSTRALIAN PYCNOMERI OF THE OPAQUE OR SUB-OPAQUE GROUP.

A. Interstices of elytra flattened and conspicuously punctulate.
  B. Hind angles of pronotum sharply rectangular (prothorax longer than wide) ... ... *fuliginosus*, Er.
  BB. Hind angles of pronotum obtuse (prothorax transverse) ... ... *robusticollis*, Blackb.
AA. Interstices of elytra convex, very narrow, and not distinctly punctulate.
  B. Pronotum not transversely impressed ... *interstitialis*, Blackb.
  BB. Pronotum transversely impressed about the middle ... ... *sulcicollis*, Blac .

CERYLON.

The following species is closely allied to some of the European members of the genus *Cerylon*, which genus in Lacordaire's classification belongs to a "Tribe" of the *Colydiidæ* that has not —so far as I know—been previously reported as Australian.

C. alienigenum, sp. nov. Minus convexum, sat latum (forma fere ut *C. ferruginei*, Steph.); obscure ferrugineum, prothorace piceo; nitidum; antennis (fere ut *C. ferruginei*, sed clava breviori latiori) sat robustis, articulis 2° 3° que brevibus; capite subtilissime punctulato; prothorace subquadrato, supra quam *ferruginei* minus fortiter minus crebre punctulato, ad basin utrinque profunde impresso; elytris punctulato-striatis, striis profundis versus apicem (subsuturali excepta) obsoletis (subsuturali antice abbreviata, 2ª 4ª basin attingentibus, 5ª 6ª que antrorsum parum ultra medium productis, interstitiis latis planis vix perspicue punctulatis; sternis et segmento basali ventrali ad latera grosse sparsim punctulatis; hoc in medio oblique bistriato (fere ut *Diphylli*). Long., 1 l.; lat., $\frac{2}{5}$ l.

Like the European *C. ferrugineum*, Steph., in form and color except in the prothorax being considerably darker than the elytra. The pronotum (compared with that of others known to me of the genus) is less strongly and less closely punctulate. The fifth and sixth striæ of the elytra are very short.

N.S. Wales.

CUCUJIDÆ.

PROSTOMIS.

The members of this genus (especially males) seem to be rare in collections, and the species are closely allied *inter se*.

P. Atkinsoni, Waterh. I have taken in Tasmania (and have received from several Tasmanian correspondents) a *Prostomis* which I presume to be this species. I cannot say that it agrees very exactly with the description; but weighing in combination the two facts—that I have seen no other *Prostomis* from Tasmania and that this particular one is the only *Prostomis* I know with the puncturation of the head and pronotum very fine (a character which its author attributes to *P. Atkinsoni*)—I do not see much room for doubt. The principal differences are as follows:—Waterhouse calls the sides of the prothorax "vix arcuatis," whereas in the species before me they are certainly more rounded (especially in the male) than that expression makes them; Waterhouse's sexual distinctions do not fit the species before me. I have two specimens taken under the bark of one tree which I cannot doubt are male and female of a single species —one of them, which I have no doubt is the male, is Long., $4\frac{1}{2}$ l.

(the other being Long., 3½ l.) and has mandibles much more developed than the other, considerably longer antennæ, a much larger and wider head, and a larger prothorax (of which the sides are quite strongly rounded). Waterhouse makes no reference to any sexual difference in the antennæ, calls the sculpture of the female "more distinct throughout" and says that its prothorax is constricted behind the front angles (it is slightly so in the specimen I have above called the male, but not in the other). My specimens do not show any noticeable difference in the sculpture (i.e. puncturation and striation) between the sexes. I do not think Waterhouse *reversed* the sexes, as his description of the form of the mandibles is inconsistent with his having done so. It will be noted that the sexual distinctions as I have described them are very similar to those of many *Læmophlœi* and other *Cucujidæ*. In this species the left mandible and jugular process are considerably longer than the right The apical ventral segment is somewhat narrowly rounded in both sexes and in the male (as in others of the genus) is thickened and somewhat reflexed round its apex. The left jugular process bears an external obtuse feebly defined tooth considerably in front of the middle and at the apex is dilated and truncate—the truncate front margin being subdentiform at both ends (especially the external end).

P. intermedius, Blackb. My description of this species needs amending, as at the time I made it I had not before me specimens of any *Prostomis* that I could rely upon as being the sexes of one species and consequently I treated sexual characters as specific. The type is a female and I have since taken a specimen in the Victorian Dividing Range which I have no doubt is its male. It will be convenient to substitute the following for the original description.

Mas. Elongatus; angustus; postice sat fortiter angustatus; nitidus; glaber; piceus, capite prothorace pedibus maculisque in elytris nonnullis indeterminatis rufescentibus; mandibulis minus latis, valde elongatis, crebre subtilius punctulatis, ad latera modice angulatis, sinistro quam dexter longiori; processubus jugularibus inter se disparibus, sinistro longe ultra medium dente externo armato hinc ad apicem acuminato (apice ipso sat acuto, oblique intus et deorsum curvato), dextro multo breviori leviter sinuato ad apicem acuminato; capite quam corpus ceterum latiori, sparsim subtiliter punctulato, postice transversim sulcato (sulco fortiter punctulato); antennis sat elongatis, prothoracis basin fere attingentibus, articulis 3° quam latiori paullo longiori 9°—11° clavam male definitam formantibus (9° 10° que vix transversis); prothorace sat quadrato sed leviter transverso, sparsim subtiliter

punctulato, obsolete canaliculato (canali et antice et postice sat late abbreviato), lateribus minus arcuatis, angulis obtusis nullo modo prominentibus; elytris punctulato-striatis (sculptura apicem nec basin versus obsoleta), striis 4° 5° que et interstitio 5° pone humerum sat fortiter depressis. Long., 5⅔ l.; lat. (trans caput), 1 l.

Fem. minore (Long., 4 l.); colore (exempli typici) toto luteo; mandibulis processubus jugularibus antennisque brevioribus; capite paullo minus lato, magis convexo.

In my original description the term "subtilissime punctulata" applied to the head and pronotum is not a happy one in view of the fact that the same in *Atkinsoni* are still more finely punctulate. The left mandible of the male is nearly twice as long as the interval between the clypeal suture and the posterior transverse sulcus of the head—that of the female nearly once and a half the same interval. Compared with the species I have identified with *P. Atkinsoni* (see above) this species is considerably less finely and less sparsely punctulate on the mandibles head pronotum and metasternum; its mandibles are considerably longer and narrower in both sexes, its antennæ are a trifle shorter and stouter in both sexes (the third joint, especially, being shorter), the left jugular process is of a very different shape, the punctulate striæ are evidently better defined close to the base, and the post-humeral depression is much stronger (in *Atkinsoni* almost obsolete); this consists of a slightly elongate gentle concavity extending in width from the fourth to the sixth interstice, and therefore including two striæ and the interval between them. I attach very little importance to the difference in colour.

Victoria.

P. cornutus, Waterh. My example of this species is a female (Long., 2½ l.). Its antennæ are a trifle (and its mandibles much) shorter than those of *intermedius*. The left mandible is a little longer than the right, but the two jugular processes are alike in size and shape. These latter are devoid of a defined external tooth and are of sinuate-acuminate shape from the middle to the apex, where they are sharply pointed. The third joint of the antennæ is not longer than wide. The well-defined round fovea on the clypeus (referred to by Waterhouse) is probably a reliable character. The longitudinal channel of the pronotum is considerably more defined than in any other *Prostomis* known to me. The position of the jugular processes rendering them visible from above is a very remarkable character. The prothorax is not transverse.

P. gladiator, sp. nov. Fem. Elongatus; angustus; postice minus angustatus; nitidus; glaber; rufo-ferrugineus, antennis

mandibulisque nonnihil obscurioribus; his minus elongatis minus latis, ad latera vix angulatis, cetera ut *P. intermedii*, Blackb.; processubus jugularibus fere ut *P. intermedii* sed sinistro externe inermi; capite fere ut *P. intermedii* sed paullo minus lato; antennis quam *P. intermedii* paullo gracilioribus vix brevioribus, articulis 3° quam latiori vix longiori 10° manifeste transverso; prothorace vix transverso, antice subangustato, cetera ut *P. intermedii;* elytris fere ut *P. intermedii* sed pone humeros vix perspicue depressis. Long., 3¼ l.; lat, ⅘ l.

This species is so like *P. intermedius* (of the same sex) that it seems unnecessary to repeat the diagnosis of that species in all its details; it may be read as the diagnosis of *P. gladiator* subject to the qualifications specified above. Compared with *intermedius* (female) the mandibles are distinctly shorter (the left one not much longer than the distance from the clypeal suture to the transverse sulcus) and scarcely angulate externally, the left jugular process has no external tooth, the antennæ are more slender with the third joint distinctly shorter and the tenth a trifle more transverse, the head is very evidently narrower and more convex, the prothorax is very conspicuously narrower with its front decidedly narrower than its base, and the elytra are almost without any post-humeral impression and also are less narrowed behind. It was on the authority of this insect that in my original description of *P. intermedius* I gave N.S. Wales as a habitat, thinking that the differences between *intermedius* and *gladiator* might be sexual—which, however, I now know they are not.

N.S. Wales (Blue Mountains); given to me by the late Mr. Olliff.

Tabulation of the Described Australian Species of Prostomis.

A. Jugular processes invisible from above.
  B. Left jugular process acute at apex.
    C. Left jugular process toothed externally before the apex ... ... *intermedius*, Blackb.
    CC. Left jugular process unarmed externally ... *gladiator*, Blackb.
  BB. Left jugular process dilated and truncate at apex ... ... *Atkinsoni*, Waterh. ?
AA. Jugular processes visible from above ... *cornutus*, Waterh.

IPSAPHES.

This name cannot stand, as it is undoubtedly a synonym of *Platysus*—indeed I have no doubt of *I. mærosus*, Pasc. (the type of *Ipsaphes)*, being even specifically identical with *P. obscurus*, Er. (the type of *Platisus)*. Pascoe's action in founding *Ipsaphes* is incomprehensible since the most noteworthy

distinction he indicates from *Platisus* is "the denticulate margins of the prothorax," and Erickson in describing *P. obscurus* had written "margine (thoracis) denticulato." I suppose Pascoe must have compared his insect with some specimen that was wrongly named *Platisus* and have not referred to the diagnosis of the genus. I have not seen any previous note of this synonymy.

I. bicolor, Olliff. This insect is certainly not a *Platisus*, and I can find no reason to separate it from *Cucujus*. It has the basal joint of the tarsi very short It must be extraordinarily close to *Cucujus coloniarius*, Olliff. Their author published the description of the two in the same memoir and stated that the two had been taken in company. Both descriptions are decidedly lengthy and yet almost identical; comparing them together the only definite points of difference I can find are that the clypeus in *coloniarius* is "truncate" in front and in *bicolor* "very slightly emarginate," the antennæ in *coloniarius* "rather longer than" (in *bicolor* "about as long as") the head and prothorax, the sides of the prothorax in *coloniarius* "feebly serrate" (in *bicolor* "provided with short blunt teeth"), the scutellum in *coloniarius* "rounded" (in *bicolor* "somewhat pointed") behind, and a few other such slight variation of terms; also the under-surface of *coloniarius* is called "black" (without qualification) and that of *bicolor* "black, with the abdominal segments rather bright red." Various characters—e.g. those of the angles of the prothorax—are described in respect of one or other only of the two (if they are two) species. Strange to say, although he described on successive pages of his memoir these two insects taken in company, of practically the same size, and evidently of remarkable superficial similarity *inter se*, Olliff makes no remark on their resemblance to each other and does not mention the characters of either in describing the other. Nevertheless I am disposed to believe that he had before him two valid species of *Cucujus* on the following grounds:—I have before me specimens of an insect which I have taken somewhat freely on the Victorian Mountains and which there can be no doubt is *Ipsaphes bicolor*, Oll. (though, as stated above, it is certainly not con generic with *I. mœrosus*, Pasc., *Platisus*, Er.). In a fairly long series there is not one with a black abdomen—though several have the abdomen slightly spotted with black. In combination with that undoubted color difference, I find that the specimens in question do not agree with the description of *coloniarius* in an important character, the hind angles of the prothorax being sharply rectangular (even subdentiform), whereas Olliff says that those angles in *coloniarius* are "rounded"—he does not specify their character in *bicolor*. The only conclusion possible

therefore is that the two species although congeneric and greatly resembling each other superficially, are distinct.

LÆMOPHLŒUS.

The Australian species of this genus are moderately distinct *inter se*, most of them having some strongly marked character. Unfortunately, however, some of them have been very insufficiently described. Two cosmopolitan species have been reported from Australia (*ferrugineus*, Steph., and *pusillus*, Schönh.), and also *L. testaceus*, Fab. I do not know whether there is any authority for the occurrence of the last-named beyond its mention as Australian by Mr. Olliff; as will be seen below. I doubt whether the insect that author referred to is really *testaceus*. The specific characters of *Læmophlœi* are strongly marked, in some cases in the sexual characters, in some in the colour and pattern, in some in the structure of the prothorax or elytra. The striation of the elytra is of a peculiar kind and appears different in the same specimen from different points of view, so that different authors state their number differently (e.g. the dorsal striæ of *L. ferrugineus*, Steph., are stated by its author to be three, but Erichson calls them four). If a specimen of that insect be held obliquely with its head directed towards the observer there seem to be numerous ill-defined striæ but if it be looked at from the side (across the specimen) there is a certain point of view from which it seems to have very distinctly only three dorsal striæ. This introduces an element of uncertainty into descriptions of *Læmophlœi* which merely state that the elytra have such-and-such a number of dorsal striæ, and therefore in the following descriptions I endeavour to indicate the nature of the striation more exactly. The only Australian *Læmophlœi* that I have seen not having the dorsal striæ of their elytra of the same character as in *ferrugineus* are *amabilis*, Oll., and the species described below as *L. Frenchi*, in which the intermediate feeble striæ that in the other species are visible from favorable points of view are all but non-existent. Among the Australian *Læmophlœi*, however, the striation of the elytra does not seem to me in general a very useful character for the determination of species. In tabulating the species of this genus the structure of the prothorax seems to form the best character for constructing groups.

The following tabulation of the characters of the described Australian *Læmophlœi* includes all that I can ascertain to have been described. Some of the species are unknown to me in nature and these I have placed on the authority of descriptions and figures. In some instances I have had to assume the absence of a character from its not being mentioned in the description—

especially I have assumed that the sublateral striæ of the pronotum are not of conspicuously exceptional structure where their structure is not stated to be so. To guard against possible error through this assumption the names of the species concerning which there is such doubt are in italics :—

A. Pronotum with only one well defined stria on either side.
  B. The front angles of the prothorax not distinctly defined (when viewed from above).
    C. Sides of prothorax strongly rounded (antennæ of male very remarkable) ... diemenensis, *Blackb.*
    CC. Sides of prothorax at most feebly arcuate.
      D. Disc of pronotum bearing a shining tubercle.
        E. Form very narrow and elongate.
          F. Hind angles of prothorax sharp (as seen from above) ... ... murrayensis, *Blackb.*
          FF. Hind angles of prothorax obtuse (as seen from above) ... ... pusulæ, *Blackb.*
        EE. Form much wider and less elongate... pusillus, *Schönh.*
      DD. Disc of pronotum even.
        E. Prothorax not (or very slightly) narrowed behind ... ... Lindi, *Blackb.*
        EE. Prothorax much narrowed behind.
          F. Form very narrow and fragile ... insignior, *Blackb.*
          FF. Form much more robust ... ... ferrugineus, *Steph.*
  BB. The front angles of the prothorax well defined.
    C. Pronotum and elytra not bearing rows of tubercles.
      D. Prothorax wider than long.
        E. General colour testaceous or light brown —no well defined markings.
          F. The sublateral striæ of the pronotum simple.
            G. Forehead with a longitudinal impressed line.
              H. The intermediate dorsal striæ of the elytra present.
                I. Front angles of prothorax decidedly dentiform ... ... *testaceus*, Fab.
                II. Front angles of prothorax not dentiform ... ... *contaminatus*, Gr.
              HH. The intermediate dorsal striæ of the elytra obliterated as *striæ* ... ... *lepidus*, Gr.
            GG. Forehead not having an impressed longitudinal line.
              H. Prothorax strongly transverse ... *conterminus*, Oll.
              HH. Prothorax feebly transverse ... *Leachi*, Gr.
          FF. Sublateral stria of pronotum very much deepened on its hind half.
            G. Form comparatively narrow.
              H. Antennæ of female rather elongate and scarcely clubbed .. Macleayi, *Oll.*
              HH. Antennæ of female quite short and rather distinctly clubbed difficilis, *Blackb.*

GG. Form notably wider ... ... rigidus, *Oll.*
FFF. Sublateral striæ of pronotum dilated into a deep wide fovea behind middle ... ... Australasiæ, *Blackb.*
EE. Elytra with well defined markings.
F. General colour testaceous—markings of the elytra dark.
G. The intermediate dorsal striæ of the elytra obliterated as striæ.
H. Elytra with a large humeral spot (and a submedian fascia) ... amabilis, *Oll.*
HH. Elytra not having a humeral spot (only a postmedian fascia) ... ... insignis, *Gr.*
GG. The dorsal striæ of the elytra normal ... ... tasmanicus, *Gr.*
FF. General colour dark. Elytra with pale markings.
G. General colour metallic green ... Ramsayi, *Oll.*
GG. General colour blackish (antennæ of male very remarkable) ... Frenchi, *Blackb.*
DD. Prothorax not wider than long ... parvulus, *Gr.*
CC. Pronotum and elytra having rows of tubercles ... ... tuberculatus, *Gr.*
AA. Pronotum with two well defined sublateral striæ on either side ... ... bistiatus, *Gr.*

L. diemenensis, sp. nov. Mas. Depressus; sat latus; nitidus; vix pubescens; testaceo-brunneus; capite magno, quam prothorax vix angustiori, subtiliter minus crebre punctulato, postice in medio leviter foveolato (fovea antrorsum subtiliter lineatim producta), clypeo antice truncato; oculis parvis; antennis quam caput prothoraxque conjuncta paullo longioribus, articulis basali quam sequentes 5 vix breviori fortiter arcuato (ut *L. Fauveli*, Gr., sed ad apicem parum dilatato) ad apicem late truncato, 2°—7° (2° 7° que leviter, 3° 6° que fortiter, 4° 5° que fortissime) transversis, 8° parvo, 9° 10° que quam hic sat longioribus, 11° quam 10us fere duplo longiori; prothorace quam longiori ut 3 ad 2 latiori, postice parum angustato, sparsius subtilius punctulato, utrinque unistriato, disco planato, lateribus sat fortiter arcuatis, angulis anticis (superne visis) haud bene definitis posticis minute dentiformibus; elytris (certo adspectu) striis dorsalibus 3 (ut *L. ferruginei*, Steph.) impressis, latera versus carinatis, interstitiis leviter punctulatis. Long., 1½ l.; lat., ½ l.

The remarkable antennæ of this species at once distinguish it from all its Australian congeners and from all other *Lamophlæi* known to me. It seems to be allied to *L. Fauveli*, Gr., which it somewhat resembles in outline, but the antennæ of the male are very different, it is differently colored, its eyes are much smaller than those of *Fauveli* appear in the figure, &c.

Tasmania.

L. murrayensis, sp. nov. Mas. Sat angustus; modice elongatus; nitidus; parum pubescens; testaceus; capite quam prothorax haud angustiori, subtiliter minus crebre punctulato, sat convexo, utrinque longitudinaliter impresso, sulco mediano nullo, clypeo antice subtruncato; antennis gracilibus, quam corpus haud multo brevioribus, articulis apicalibus quam latioribus multo longioribus; prothorace parum transverso, postice leviter angustato, supra subtilius subsparsim punctulato, utrinque subtiliter unistriato, disco planato pernitido tuberculo parvo vix pone medium instructo, lateribus leviter arcuatis, angulis anticis (superne visis) haud bene definitis posticis sat acute rectis; elytris (certo adspectu) striis dorsalibus 3 (ut *L. ferruginei*, Steph.) impressis, latera versus tenuiter carinatis, interstitiis perspicue punctulatis.

Feminæ capite angustiori, antennis quam caput prothoraxque conjuncta parum longioribus, articulis 9° 10° que quam latioribus vix longioribus; forma magis elongata, magis parallela. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l. (fere).

The form and proportions of this species (especially the female) are well represented by M. Grouvelle's figure of *L. bistriatus* (Ann. Soc. Ent. Fr., 1877, Pl. ii., fig. 8), but I cannot find any trace of duplication in the striæ of the pronotum, and the punctures of the head and pronotum are very much closer than they are represented in that figure. It belongs to the group of *Læmophlœi* having a single stria on either side of the pronotum and the front angles of that segment not prominent, of which the described species already known as Australian are *ferrugineus*, Steph., *parvulus*, Gr., and *pusillus*, Schönh. I took a single example on the Victorian mountains of a *Læmophlœus* (female) which is extremely close to *Murrayensis* but probably distinct Its prothorax is considerably more narrowed behind and not flattened dorsally; its tubercle also is smaller and nearer to the front. It is better, however, in the case of so extremely close a species not to describe without seeing the male.

S. Australia (near Murray Bridge).

L. Lindi, Blackb. In my diagnosis of this species (P.L.S., N.S.W., 1888, p. 841) I characterised its pronotum as "utrinque subtiliter bistriatum" and in the remarks that followed I noted the external of the two striæ as "extremely fine and scarcely continuously traceable." Since the issue of that diagnosis I have had the opportunity of examining numerous specimens of the same species and find that in some of them this second stria is so faint and fragmentary as to be practically wanting. Unfortunately I do not possess an example, for comparison, of any of the very few other species of the genus that have been diagnosed as

with the pronotum "utrinque bistriatum" but an examination of the figures of some of them leads me to think that (at any rate in some—probably all) the second stria is very clearly defined and not much different from the inner one. The pronotum of *Lindi* therefore should I think be called "utrinque unistriatum" with the qualification that in some examples there are faint traces of a second stria. I find also that the short furrow on the forehead (referred to in my diagnosis) is not at all clearly defined in some examples and is not a character on which much reliance can be placed. It seems therefore desirable to furnish an amended diagnosis, which will be found below. Unless all the examples that I have seen are of one sex the sexual distinctions of this species are extremely slight, as in all of them the head is scarcely as wide as the prothorax, and there is very little difference in the antennæ. In some, however, the antennæ seem to be slightly longer—especially their ninth and tenth joints—than in others. I may add that I have a specimen from the Victorian mountains which differs from my South Australian specimens in having the pronotum evidently less closely punctured, with the disc flattened, otherwise presenting no notable distinction. It is probably another species, but more specimens should be examined before it is described.

Elongatus; angustus; postice leviter angustatus; nitidus; rufo-testaceus; capite (exemplorum visorum) quam prothorax parum angustiori, sat convexo, subtiliter crebrius punctulato, utrinque longitudinaliter vix impresso, sulco mediano brevi (leviter vel vix) impresso, clypeo antice subtruncato; antennis modicis, quam caput prothoraxque conjuncta vix longioribus, articulis 9° 10° que quam latioribus paullo vel vix longioribus; prothorace quam longiori parum latiori, postice parum angustato, supra fere ut caput punctulato, utrinque unistriato (nonnullorum exemplorum stria secunda obsolete impresso), lateribus parum arcuatis, angulis anticis (superne visis) haud bene definitis posticis sat acute rectis; elytris (certo adspectu) striis dorsalibus 3 (ut *L. ferruginei*, Steph.) impressis, latera versus tenuiter carinatis, interstitiis punctulatis. Long., 1 l.; lat., $\frac{3}{10}$ l. (vix).

S. Australia.

L. pusulæ, sp. nov. Fem. Elongatus; nitidus; parum pubescens; testaceus; capite quam prothorax vix angustiori, minus subtiliter crebrius punctulato, minus convexo, utrinque longitudinaliter impresso, sulco mediano nullo, clypeo antice vix emarginato, antennis gracilibus quam caput prothoraxque conjuncta vix longioribus, articulis 9° 10° que transversis (his cum 11° clavam sat distinctam formantibus); pro-

thorace leviter transverso, postice manifeste angustato, supra crebre subfortiter punctulato, utrinque subtiliter unistriato, disco planato tuberculo elongato sat magno instructo, lateribus parum arcuatis, angulis anticis (superne visis) haud bene definitis posticis (superne visis) obtusis sed sursum subdentiformibus; elytris (certo adspectu) striis dorsalibus 3 (ut *L. ferruginei*, Steph.), impressis, latera versus tenuiter carinatis, interstitiis perspicue punctulatis. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l. (fere).

A narrow elongate parallel species resembling *L. murrayensis* in form and proportions and belonging to the same group, but very distinct from it by the much shorter antennæ (at any rate of the female, in which sex the apical three joints form a more evident club than is usual in the genus), the notably stronger and closer puncturation of the pronotum (which, moreover, bears a larger and differently shaped tubercle) and the obtuse (as seen from above) hind angles of the prothorax. These angles, however, are minutely turned up in a subdentiform fashion at their extreme apex, so that if looked at very obliquely from the side—across the insect—they do not appear to be obtuse.

S. Australia (Port Augusta).

L. insignior, sp. nov. Fem. Sat angustus; modice elongatus; postice manifeste angustatus; nitidus; parum pubescens; testaceus, elytris (exempli typici) postice infuscatis; capite quam prothorax vix angustiori, subtilissime punctulato, minus convexo, sat æquali, clypeo antice subtruncato; antennis sat gracilibus, quam caput prothoraxque conjuncta vix longioribus, sat moniliformibus, articulis 9° haud 10° vix quam latioribus longioribus (his cum 11° clavam manifestam formantibus); prothorace parum transverso, postice sat fortiter angustato, supra crebre subtilissime punctulato, utrinque subtiliter unistriato, disco vix planato, lateribus antice modice arcuatis postice subsinuatis, angulis anticis (superne visis) haud bene definitis posticis minutissime dentiformibus, elytris (certo adspectu) striis dorsalibus 3 (ut *L. ferruginei*, Steph.), impressis, latera versus tenuiter carinatis, interstitiis obsolete punctulatis. Long., $\frac{7}{10}$ l.; lat., $\frac{3}{10}$ l. (fere).

This minute species resembles all the preceding in the scarcely marked front angles of its pronotum and the single stria on either side of the same. It is, however, of less parallel form, and its prothorax is very manifestly more narrowed behind and is punctured on its dorsal surface almost as finely and closely as that of *L ferrugineus*, Steph. It differs also from *L. murrayensis* and *pusulæ* in the even surface of its head and pronotum, from

lindensis by the evidently shorter antennæ—at any rate, of the female—from *parvulus*, Gr., by its shorter prothorax which is not wider than the elytra, from *ferrugineus* by its much smaller size, much narrower build, prothorax less narrowed behind, &c., from *pusillus* by its very much narrower form prothorax narrowed behind, &c.

Victoria, (Dividing Range).

L. pusillus, Schönh. I have four Australian specimens that have been examined by M. Grouvelle—the well-known specialist on this group—and ticketed "*L. pusillus*." They—and other Australian examples before me of the same species—all have a small shining tubercle about the centre of the disc of the pronotum. This character is not mentioned in Erichson's somewhat lengthy description of the insect (Ins. Deutschl., III., p. 321). I have not Schönherr's original description available. Examples from other parts of the world bearing the same name all present this character.

L. articeps, Olliff. This species is very close to—if not identical with—*L. tasmanicus*, Gr. Olliff's remark on it is "appears to be more nearly allied to *L. tasmanicus* than to any other species," but he adds no mention of the distinctive characters. Both descriptions are fairly full and they agree so exactly in respect of the leading characters—e.g. the remarkable coloring and pattern of the elytra, and the notably strong impression of the fourth elytral stria—that in spite of some little discrepancies in the language employed to characterise the puncturation I can hardly think them founded on two species. I have before me examples from the Victorian mountains (whose Coleopterous fauna is closely allied to that of Tasmania—Grouvelle's locality) and N.S. Wales (which Olliff quotes for *articeps)* which agree in all their strongly marked characters with those set forth in both descriptions. The specimen from N.S. Wales is undoubtedly a trifle less strongly punctulate than the Victorian ones of the same sex—from the descriptions *articeps* appears to be less strongly punctured than *tasmanicus*—but certainly not so markedly as to in itself justify specific distinction. I cannot think it in the least likely that I have before me a species with the same unusual elytral pattern and other strongly marked characters as the specimens that Olliff and Grouvelle described, and yet distinct from them, but undoubtedly my examples present some characters which I cannot understand both those authors passing over without note—for the lateral outline of the prothorax is quite evidently trisinuate and the space on the pronotum intermediate between the lateral stria and the lateral margin bears a deep transverse furrow slightly behind its middle. I may add that one of my specimens was sent to me by Mr. Lea ticketed as "*L. articeps*, Oll."

L. Macleayi, Olliff. This species is practically undescribed. It is the insect on which Macleay founded his genus *Placonotus* —which is in no way different from *Læmophlœus* (as Olliff testified after examining the type). Macleay called his species *longicornis* (a nom. præocc. in *Læmophlœus*) and Olliff renamed it *Macleayi*. Macleay's very brief description is quite worthless, and would apply to many *Læmophlœi*. Unfortunately Olliff did not describe it, but merely remarked on its resemblance to *L. testaceus*, Fab., and pointed out a few differences (from *testaceus*) so slight that I am convinced it is not really distinct from the insect which Olliff regarded as *testaceus*. But here again there is a further difficulty in Olliff's having given no description whatever of the species that he calls *testaceus*. The only indication he furnishes for the identification of the latter is to be found in his remark that it is common and widely distributed. By means of this clue, however, I feel satisfied that I can identify the *Læmophlœus* to which he applied the name. I have collected the insect in question and received it from other collectors plentifully—its localities ranging from Cairns to Tasmania and Eyre's Peninsula. I cannot think it the species that Erichson (Ins. Deutsch. III., p. 320) describes as *testaceus*, Fab., and which I believe is generally accepted as being correctly identified by him—inasmuch as *inter alia multa* Erichson places first among the characters rendering it "easily recognisable" the presence of a longitudinal impressed line on the head—which line is certainly not present in the Australian insect. The following is a description of the salient characters of the latter:—(as the result of examining numerous specimens); head with its general surface even or almost even—the clypeal suture, however, strongly impressed; antennæ of male not much shorter than the body (of the female considerably shorter) with the basal joint decidedly large—very little indication of a club in either sex; prothorax not strongly transverse, its front angles dentiform, one stria (very much deeper and wider in its hind than in its front half) on either side of the pronotum; very variable in size.

A few of the specimens before me if isolated from the rest might appear to represent species distinct from each other as they differ a little in the development of characters that are sexual—the head being a trifle larger and the antennæ a trifle longer in some males than in others, and the length of the antennæ varying slightly in the females—but after careful examination of a great number of examples I am unable to divide them in any satisfactory manner—for example, of two males certainly taken in company and between which I can find no other distinction one certainly has longer antennæ than the other. If I am right

in regarding this long series as representing but one species it is distinguishable from all the other described Australian *Læmophlœi* (except *rigidus*, Oll., and *difficilis*, Blackb.), of uniform testaceous coloring (or only vaguely clouded with slight infuscation) and having the front angles of the prothorax dentiform, by the sublateral striæ of its pronotum being much stronger in their hind than in their front half. *Rigidus*, Oll. (being quoted as resembling *Beccari*, Gr., in outline) seems to be of decidedly broader form than any of the specimens before me, and the antennæ of the female of *difficilis*, Blackb., seem to me too decidedly shorter and more distinctly clubbed to be treated as the result of mere variety—but I am not very confident that even those two will stand permanently as really good species: If I am right in thinking this widely distributed species distinct from *testaceus*, Fab., it will, I think, have to bear the name *Macleayi*, Oll.

L. Australasiæ, Blackb. This species is extremely distinct from the preceding by *inter alia* the sublateral striæ of its pronotum being dilated behind their middle into a large and deep oval fovea. The coloring of the elytra to which I referred in my original description is not a reliable character as I have recently seen specimens in which the sub-apical infuscation of the elytra is only slightly developed.

L. Frenchi, sp. nov. Mas. Brevis; sat latus; modice depressus; minus nitidus; brevissime sparsim pubescens; nigro-piceus, antennis pedibus scutello macula parva humerali elytrorum apice et in elytrorum disco maculis nonnullis ferrugineis (nonnullorum exemplorum capite et prothoracis disco nonnihil rufescentibus); capite quam prothorax paullo angustiori, confertim subtilissime punctulato, inter antennas late leviter concavo et in medio linea longitudinali subtili impresso; antennis quam corpus haud multo brevioribus, articulis basali quam sequentes 4 vix breviori ad apicem intus fortiter hamato, 2° subglobulo, 3° quam hic sat minori, 3°—7° gradatim paullo longioribus, 8° breviori, 9° quam 8us fere duplo longiori, 9°—11° inter se subæqualibus; prothorace fortiter transverso supra creberrime vix perspicue punctulato, utrinque subtiliter unistriato, inter striam et medium segmentum longitudinaliter leviter concavo, lateribus modice arcuatis, angulis anticis bene determinatis (haud dentiformibus) acutis posticis acute rectis; elytris striis dorsalibus 3 impressis, latera versus carinatis, interstitiis creberrime vix perspicue punctulatis.

Fem. antennis quam corpus multo brevioribus, articulo basali quam sequentes 2 conjuncta breviori, haud hamato. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

The great enlargement and distortion of the basal joint of the antennæ in the male distinguishes this species from all other Australian *Læmophlœi* of which the male has been described except *L. diemenensis*, and no other resembles it in colour and markings unless it be *L. Ramsayi*, Oll., which is described as of dark colour with testaceous markings, but its general colour is said to be metallic green with an ante-median elytral testaceous fascia, whereas the present species is blackish with a small humeral spot, two discal postmedian spots and the apex reddish. It is the only Australian *Læmophlœus* that I have seen having the dorsal striæ evidently (from all points of view) only three in number.

Victoria (Dividing Range); also sent by Mr. French.

PLATYCOTYLUS.

P. coloratus, sp. nov. Nitidus; niger; ore antennarum basi pedibusque dilutioribus, elytris macula magna rubra discoidali ornatis; capite crebre sat fortiter punctulato; antennis quam corporis dimidium paullo brevioribus; prothorace quam longiori ut 5 ad 3 latiori, postice angustato, sat fortiter vix crebre punctulato, angulis omnibus dentiformibus, lateribus leviter arcuatis, basi media leviter impressa; scutello fortiter transverso; elytris sat fortiter punctulato-striatis, interstitiis seriatim punctulatis (5° 7° que cariniformibus), sutura pone scutellum concava. Long., 1½ l; lat., ½ l.

Smaller than the typical species (*P. inusitatus*, Oll.) and—judged by Olliff's measurements—of narrower form; also very differently colored, and with much stronger puncturation of the pronotum, which in *P. inusitatus* is said to be "very fine."

Queensland (taken by Mr. Dodd).

LATHROPUS.

I refer to *Lathropus* a small *Cucujid* which I met with under the bark of Eucalyptus on the Victorian Mountains. It has the general appearance of *Læmophlœus*, but differs from it by the short inconspicuous apical spine of its front tibiæ, by its short antennæ with an abruptly clavate apex of three joints and by its tarsi with the basal four joints all very short—the first scarcely visible—and together scarcely half as long as the fifth joint. *Lathropus* is a widely distributed genus, having been recorded from South America as well as Europe (the habitat of the typical species)—possibly also from other places—but it has not been hitherto known as Australian.

L. brightensis, sp. nov. Sat elongatus; modice depressus; modice nitidus; tenuissime sparsim pubescens; testaceo-ferrugineus, elytris circa scutellum et ante apicem infuscatis vel piceis; capite subconvexo quam prothorax angustiori,

crebre sat fortiter punctulato, fronte antice emarginata, sutura clypeali profunda; antennis prothoracis basin haud attingentibus, articulis 1° 2° que incrassatis 3°—8° brevibus parvis 9° 10° que transversis (his cum 11° ovali clavam sat abruptam formantibus); prothorace quam elytra paullo angustiori, quam latiori sublongiori, antice leviter angustato, supra crebre fortiter punctulato, carina mediana longitudinali obsoleta instructa, ante basin impresso, utrinque prope marginem lateralem carina subtili ornato, lateribus leviter arcuatis, angulis omnibus obtusis; elytris striatis, interstitiis hic et illic obtuse convexis sparsim leviter punctulatis. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

Victoria (mountains near Bright).

MYRABOLIA.

Species of this genus seem to be numerous in Australia, and are closely allied *inter se*. In this paper I offer descriptions of two new ones and also furnish a table showing the distinctive characters of the hitherto described species. The two described by Reitter (as noted more fully below) are placed in the tabulation by virtue of the characters observed in a specimen (of one of them) named by M. Grouvelle rather than on the characters assigned in the descriptions. If they are not Reitter's species I am convinced that the latter are unknown to me—which is not probable, especially since some of my specimens are from Reitter's locality (Tasmania). The character "dorsal striæ of the elytra doubled" will be found explained below under *M. longicollis*.

Tabulation of species of Myrabolia.

A. Dorsal striæ of the elytra doubled.
  B. A dorsal impression (not a mere flattening) on front part of pronotum ... ... *haroldiana*, Reitt.
  BB. No dorsal impression on the pronotum ... *parva*, Blackb.
AA. The striæ of the elytra about 9 in number.
  B. Elytral interstices with a very clearly defined single row of large punctures (scarcely smaller than those of the pronotum) ... *longicornis*, Blackb.
  BB. Puncturation of the interstices much less clearly defined.
    C. Pronotum very finely punctured (scarcely less finely than in *Lumophlæus pusillus*, Schönh) *lindensis*, Blackb.
    CC. Pronotum considerably less finely punctured.
      D. Prothorax strongly transverse ... ... *grouvelleana*, Reitt
      DD. Prothorax only feebly transverse ... *longicollis*, Blackb.

M. longicornis, sp. nov. Oblonga; sat convexa; subnitida; subtiliter fulvo pubescens; fusco-ferruginea; capite sat lato, sat fortiter minus crebre punctulato; antennis prothoracem medium excedentibus; prothorace transversim quadrato (latitudine majori parum pone apicem posita), supra ant

medium vix planato, ut caput punctulato, lateribus ante medium subsinuatis, angulis anticis obtusis posticis minute dentiformibus; elytris sat fortiter striatis, striis minus perspicue punctulatis, interstitiis planis fortiter uniseriatim punctulatis. Long., $1\frac{3}{8}$ l.; lat., $\frac{1}{2}$ l. (vix).

This species is easily recognisable by the sculpture of its elytra; the striæ are strong but scarcely visibly punctured, the interstices flat and regular without the slightest trace of striation but with a single row of closely placed very conspicuous punctures which are scarcely smaller than the punctures of the pronotum and are the only conspicuous punctures on the elytra. The antennæ are a little longer than in the other *Myraboliæ* known to me, and the form of the prothorax is distinctive, the sides being slightly sinuate in front of their middle, and at the front of the sinuation the width of the prothorax being quite fully as wide as—to the eye it looks wider than, but by measurement I cannot make it so—at any other part.

Victoria.

M. longicollis, sp. nov. Oblonga; vix depressa; subnitida; subtiliter fulvo-pubescens; fusco-ferruginea; capite minus lato, crebre sat fortiter subrugulose punctulato; antennis minus elongatis; prothorace minus fortiter transverso, supra ante medium vix planato, subfortiter sat crebre nec rugulose punctulato, lateribus sat rectis, angulis anticis obtusis posticis minute vix subdentiformibus; elytris leviter punctulato-striatis, interstitiis uniseriatim subtilius punctulatis externe (certo adspectu) subtiliter vix carinatis (interstitiis 2°—5° certo adspectu subtiliter striatis). Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

The elytral interstices have a peculiar structure—more or less similar to that of nearly all the other *Myraboliæ* known to me—which is difficult to describe. The space between each two striæ seems to be on a slightly inclined plane so that its external edge is a trifle higher than the other edge and from a certain point of view its external edge looks very finely cariniform—this has some analogy with the structure of the interstices in many *Læmophlœi*. The dorsal interstices moreover have a slight tendency to the peculiar character—well-marked in *M. parva*, Blackb., and in the species that I take to be *haroldiana*, Reitt.—of each bearing a punctulate stria running down its middle which from a certain point of view makes it appear as if there were twice as many dorsal striæ as in the species not possessing this character. Here, however, it is very slight—so slight that in tabulating the species of the genus I have disregarded it. This species differs markedly from all its congeners known to me by its very evidently narrower and less transverse prothorax.

Victoria.

M. grouvelleana, Reitt. I have a specimen of a *Myrabolia* given me by M. Grouvelle, ticketed with the name "*M. grouvelleana*," and quite satisfactorily agreeing with Reitter's generic characters—but if it is rightly named as a *species* Reitter's description is a very poor one. The head and pronotum of the specimen are decidedly strongly punctulate (the individual punctures are hardly smaller than those on the pronotum of *Carpophilus hemipterus*—though they are very much more closely and rugulosely disposed than in that insect)—whereas Reitter calls the head and pronotum "subtiliter punctata." The error is I think more likely to be in Reitter's description than in Grouvelle's determination, but on account of the doubt I have abstained in describing the new species of this memoir from recording their differences from *grouvelleana*.

M. haroldiana, Reitt. Reitter calls the head and pronotum of this species also "subtiliter punctata." In assigning the name to one of the species before me (the only one of them having a dorsal impression on the front part of the pronotum, which Reitter gives as a distinctive character of *haroldiana*) I have taken the term "subtiliter punctata" as implying puncturation similar to that of the species sent by Grouvelle as *grouvelleana*, and note that it is not much different from that which in my descriptions I have called "sat fortis" or "subfortis," and I may add that in my former paper on *Myrabolia* (Tr. R.S., S.A., 1892), I applied the same qualification to Reitter's descriptions. *M. parva*, Blackb. and *lindensis*, Blackb. have considerably finer puncturation of their pronotum than in the specimen named by M. Grouvelle but in other respects they do not at all agree as species with Reitter's descriptions.

CATHARTUS (?).

The following species I refer to *Cathartus* only with hesitation, but I do not think there is any other described genus to which it can be referred and it is certainly very near to that one. I unfortunately cannot refer to the diagnosis of *Cathartus* and have to fall back on a comparison with *C. advena*, Waltl.—which I believe is the type—so that I should not be justified in forming a new genus for the present insect, which does not seem to me to differ from *C. advena* by any characters likely to be generic unless it be that the hind coxæ are somewhat less widely separated—making the ventral projection between them more triangular—and that the tarsi differ somewhat, each of the basal three joints being prolonged on the undersurface—the first feebly, the second decidedly, the third strongly—while in *C. advena* the basal joint does not appear to have any prolongment, the second only a slight one, and the third a strong one. The length of the tars

and proportions of their joints do not seem to differ materially from the same in *C. advena*. The antennæ are very similar to those of *C. advena*, though the second joint is somewhat smaller in proportion to the first and third; the genæ are acute as in *C. advena*, and the prothorax has pronounced anterior angles of the same kind as in that insect (though less strong) its form however being more narrowed hindward and the sides being finely crenulate. These particulars will no doubt enable my note to be corrected if I have overlooked any described genus to which this species ought to be referred rather than *Cathartus*; there certainly is no other genus known as Australian in which it could be placed.

C. (?) cairnsensis, sp nov. Sat elongatus; sat angustus; breviter albido-pubescens; rufo-testaceus; capite confertim leviter subrugulose punctulato, æqualiter convexo; prothorace quam latiori vix longiori, supra ut caput punctulato, postice manifeste angustato, in dorso longitudinaliter vix planato, lateribus subsinuatis subtiliter crenulatis, angulis anticis subdentiformibus posticis sat rectis; elytris subtilissime striatis, interstitiis uniseriatim punctulatis (puncturis minus fortiter impressis). Long., 1 l.; lat., $\frac{3}{10}$ l. (vix).

The prothorax is I think very slightly longer than wide, but it is difficult to be quite sure of one's measurements with so very small an insect; to a casual glance it looks decidedly longer than wide. This species is perhaps near *C. rugosus*, Gr. (from New Guinea), but differs from the description of that insect in having its pronotum evenly punctulate, and also (judging from Grouvelle's figure) by its form somewhat narrower and more elongate with its prothorax evidently more elongate and more distinctly narrowed behind. The general character of the sculpture seems to be very similar to that of *C. rugosus*.

N. Queensland (Cairns); given to me by Mr. Koebele.

SILVANUS.

S. brevicornis, Er. The specimen (from Tasmania) that M. Grouvelle sent me ticketed "*Myrabolia grouvelleana*, Reitt." seems to me to be undoubtedly *Silvanus brevicornis*, Er. (also from Tasmania). The insect ought therefore I think, to be called *Myrabolia brevicornis*, Er. I believe this synonymy has not been previously noted.

S. castaneus, Macl. Mr. Lea has been good enough to send me some specimens of a *Silvanus* under this name. If they are correctly named Macleay's species is not distinct from *S. unidentatus*, Fab.

S. aridulus, sp. nov. Modice angustus; sat depressus; subtiliter pubescens; piceo-brunneus, elytris pedibusque nonni-

ing four species were taken by Mr. Koebele in the Cairns district. They seem distinct from all their somewhat numerous congeners that have been described as occurring in New Guinea, &c.

P. incertior, sp. nov. Sat brevis; sat latus; testaceo-ferrugineus, antennarum articulis 9° 10° que prothorace et maculis 5 in elytris (dorsalibus magnis submedianis 2, suturali communi 1 postmediana, his anguste conjunctis, humeralibus 2) nigris vel piceis; nonnullorum exemplorum varie prothorace minus vel haud infuscato, maculis suturali humeralibusque carentibus, maculis dorsalibus minoribus, notularum colore minus determinatis; antennis corporis dimidium vix excedentibus; oculis capitis basin attingentibus; capite utrinque antice breviter minus perspicue impresso, cum pronoto grosse crebre rugulose punctulato; hoc fortiter transverso, ad basin fere ab apice angustato, lateribus leviter arcuatis denticulis setiferis circiter 8 (his parvis inter se sat æqualibus) armatis; elytris quam prothorax multo latioribus, grosse punctulato-striatis, interstitiis sat perspicue transversim rugatis; corpore pilis sat longis suberectis vestito. Long., $1\frac{1}{2}$ l.; lat., $\frac{3}{5}$ l. (vix).

An extremely variable species in respect of colouring. In some specimens the elytral dark marks are extremely similar to those of a well marked example of the European *P. bipunctatus*, Fab. The discoidal dark spot on the elytra is present in all the specimens before me, though in some it is smaller and of lighter colour than in others. In a fully marked specimen the shoulders are black, the discoidal spots are very large, the sutural spot is smaller but very dark and all the spots except the humeral ones are narrowly connected. In one specimen the three hind spots of the elytra are all present but are very small and not much darker than the general surface and are all narrowly connected as in a dark specimen.

N. Queensland (Cairns). Mr. Koebele.

P. T-notatus, sp. nov. Sat brevis; sat latus; pilis sat longis suberectis vestitus; ferrugineus, antennarum articulis 7°—10° (vel 8°—10°) prothoracis lateribus elytrorum basi et in his notula communi (hac partem dimidiam apicalem occupante) literam T simulante nigropiceis; antennis corporis dimidium manifeste excedentibus; oculis capitis basin vix attingentibus; capite fere æquali, fortiter sat crebre vix grosse haud rugulose punctulato; prothorace fortiter transverso, arcuatim fere ab apice ad basin sat fortiter angustato, quam caput paullo magis crebre punctulato, lateribus dentibus 5 (his ab apice retrorsum gradatim majoribus, posticis 2 magnis spini-

formibus) armatis; elytris quam prothorax multo latioribus, fortiter punctulato-striatis, interstitiis planis perspicue seriatim punctulatis. Long., 1⅛ l.; lat., ⅔ l.

The coloring, especially the conspicuous common T-like mark on the elytra, in combination with the comparatively large spiniform teeth on the hinder part of the lateral margin of the prothorax, makes this species easy to recognise.

N. Queensland (Cairns). Mr. Koebele.

P. upsilon, sp. nov. Sat brevis; sat latus; pilis sat longis suberectis vestitus; testaceus, antennarum articulis 7°—10° et in elytris notula communi (hac partem dimidiam apicalem occupante) literam upsilon simulante nigropiceis; antennis corporis dimidium manifeste excedentibus; oculis capitis basin attingentibus; capite ut *P. T-notati;* prothorace valde transverso, arcuatim fere ab apice ad basin minus fortiter angustato, trans basin perspicue depresso, ut caput punctulato, lateribus dentibus circiter 6 (ex his anterioribus minutis posterioribus paullo majoribus) armatis; elytris quam prothorax sat latioribus, ut præcedentis *(T-notati)* sculpturatis. Long., 1⅛ l.; lat., ⅔ l.

The whole surface of the body is testaceous except a common blackish spot on the hind half of the elytra which forms a very sharply defined and perfect representation of the Greek letter upsilon (capital). Apart from the markings this species differs from the preceding very conspicuously by its wider prothorax—less narrowed behind—having a very distinct depression across the base with the lateral projections smaller and more numerous. The eyes also seem to attain the base of the head a trifle more exactly. The part behind the head is in reality *neck* in both, but where it is visible through undue protruding of the head from the prothorax its sides converge hindward somewhat in *T-notatus* and are parallel in *upsilon*. This, however, is a slight and inconspicuous character.

N. Queensland (Cairns). Mr. Koebele.

P. vittifera, sp. nov. Minus brevis; minus latus; pilis minus elongatis vestitus; testaceo-brunneus, elytris vitta (hac ab humero ultra medium extensa) postice intus dilatata et sutura in parte apicali tertia piceis ornatis, antennarum (exempli typici) articulis apicalibus carentibus; oculis capitis basin attingentibus; capite sat æquali crebre fortiter punctulato; prothorace sat transverso, arcuatim fere ab apice ad basin sat fortiter angustato, confertim subfortiter subrugulose punctulato, lateribus denticulis setiferis circiter 8 minutis (his inter se sat æqualibus) armatis; elytris quam prothorax sat latioribus, ut *P. T-notati* sculpturatis. Long., 1⅔ l.; lat., ½ l.

I have seen only a single specimen—which has unfortunately lost the greater part of its antennæ—of this species, but as it is very distinct from any other *Psammœcus* that I can ascertain to have been described, I have no hesitation in naming it. The markings of its elytra are of quite a different type from those of the preceding three species, and the structure of its prothorax is very distinct. The lateral denticulations of that segment are somewhat like those of *P. incertior* (though more minute—one or two of them a trifle larger than the rest—especially the hindmost), but its surface is very much more closely and less coarsely punctulate. From the other two species described above the very different inequalities of the sides of its prothorax *inter alia* separate it very widely.

N. Queensland (Cairns). Mr. Koebele.

CRYPTOPHAGIDÆ.

CRYPTOPHAGUS.

C. nigro-apicalis, sp. nov. Brevis; sat parallelus; modice convexus; pubescens; ferrugineus, prothorace infuscato, elytris apicem versus nigricantibus; antennis minus robustis, articulis 9° 10° que fortiter transversis (hoc quam ille nonnihil longiori nonnihil latiori); capite pronotoque crebre fortiter subrugulose punctulatis; hoc fortiter transverso, ante scutellum utrinque impresso, lateribus ad angulum anticum extrorsum dilatatis hinc ad basin rectis; elytris fortiter sparsius punctulatis. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

I have only a single specimen of this insect and therefore cannot state positively that its male has heteromerous tarsi, but in other respects and in facies it seems to agree with *Cryptophagus*.

Victoria.

DIPHYLLUS.

It is interesting to find this genus in Australia. The species described below is evidently a member of it.

D. ornatellus, sp. nov. Ovalis; sat nitidus; pube sat longa erecta vestitus; piceo-brunneus, antennis pedibus elytrisque livide testaceo-brunneis, his nigro-piceo-variegatis; capite sat æquali fortiter sat crebre punctulato; antennis minus robustis modice elongatis, clava bi-articulata (hujus articulo basali quam alter paullo latiori); prothorace fortiter transverso, antice paullo angustato, supra fere ut caput punctulato, utrinque carina integra submarginali instructo, lateribus minus arcuatis, angulis anticis sat prominentibus posticis sat rectis; elytris obsolete striatis, striis fortiter punctulatis, interstitiis confertim subtilissime punctulatis. Long., 1 l.; lat., $\frac{1}{2}$ l. (vix).

The dark markings on the elytra are moderately sharply defined and probably variable. In the type they consist of *(a)* a common mark on the hinder half roughly resembling the letter T, *(b)* a transversely quadrate blotch just touching the upper extremity of each arm of the T and reaching the lateral margin, (*c*) a subhumeral blotch similar to (*b*) which from each extremity emits a narrow branch connecting with the corresponding extremities of (*b*). Compared with the European *D. lunatus*, Fab., this species is much smaller, with the antennæ a little longer and less stout, the surface evidently more nitid, the sculpture not much differing but with the sublateral carina of the pronotum a little nearer to the lateral margin and the rows of punctures on the elytra placed in shallower striæ, and the colors and markings very different.

Victoria (under bark of *Eucalyptus;* Dividing Range).

DIPLOCŒLUS.

D. (*Triphyllus*) *fasciatus*, Macl. Mr. Lea has been good enough to send me an example of this insect compared with the type. It agrees well with the description and is certainly a *Diplocœlus*. This correction has not to my knowledge been previously noted definitely, although Mr. Lea in one of his papers mentions *D. fasciatus*—without an author's name—and thereby probably indicates his knowledge that Macleay's species is a *Diplocœlus*.

D. ovatus, Macl., *piliger*, Reitt., and *punctatus*, Lea, must be extremely close *inter se* and are probably identical. Macleay's is the earliest of the names. Reitter says that he has not seen Macleay's description, and Lea does not refer to either *ovatus* or *piliger*. They all describe a species notable for its long erect pubescence and strongly punctulate-striate elytra. I cannot find anything in the descriptions inconsistent with their being all one species, although if that be the case Macleay described a very small specimen—yet not indicative of much greater variation in size than I find in *D. angustulus*, Blackb. Reitter thinks that the name "*ovatus*" is inconsistent with identity with his species, which is "ovalis" in form—but on referring to the description I find that Macleay gives the form as "oval" in spite of the name. These insects—whatever number of species they represent—all differ from the other described Australian *Diplocœli* as follows:—from *fasciatus*, Macl., by their unicolorous elytra; from *Leai*, Blackb., by their very much smaller size; from *angustulus*, Blackb., by their much less narrow and less parallel form; and from *exiguus*, Blackb., and the new species described below by their much stronger elytral sculpture and longer pubescence. Mr. Lea has kindly given me a specimen of his *D. punctatus;* the other two—if they are distinct from it—I have not seen.

D. opacior, sp. nov. Sat longe ovalis; pube sat brevi erecta vestitus; ferrugineus; prothorace transversim subquadrato, sat nitido, sparsim inæqualiter leviter punctulato, supra inæquali, utrinque intra marginem sat fortiter bicostato; elytris subopacis, subtiliter striatis, striis subtiliter leviter (ultra medium vix manifeste) punctulatis, interstitiis planis coriaceis; segmento ventrali basali in medio oblique bistriato; antennarum clavæ articulo basali quam 2us paullo angustiori. Long., 1 l.; lat., ⅔ l. (vix).

Of described Australian *Diplocœli* this species is nearest to *D. exiguus*, Blackb. which it resembles in colour size and outline, differing, however, *inter alia* in the uneven surface of its pronotum, in the shallower and much less regular puncturation of the same and in the much feebler sculpture of the elytra, on which the seriate punctures are fine and faintly impressed even in the front part and become very much more so from a little behind the middle. The inequalities of the pronotum consist of a shallow ill-defined concavity (not much more than a flattening) on the hinder two-thirds of the disc, and a large better-defined round fovea on either side of the concave space and a little in front of the base.

Victoria (Glenelg R.); under bark of Eucalyptus.

TABULATION OF THE DESCRIBED AUSTRALIAN DIPLOCŒLI.

A. Size very large (3½ l.)	*Leai*, Blackb.
AA. Size much smaller.	
B. Elytra bicolorous	*fasciatus*, Macl.
BB. Elytra unicolorous.	
*C. Form broader than in the other described species	*latus*, Lea
CC. Form very narrow and elongate (not unlike that of *Lyctus brunneus*, Steph.) ...	*angustulus*, Blackb.
CCC. Form oval	
D. Upper surface clothed with long erect pubescence; elytra very strongly punctulate	*oratus*, Macl. *piliger*, Reitt. *punctatus*, Lea.
DD. Pubescence much shorter; punctures of elytra much feebler	
E. Surface of pronotum even	*exiguus*, Blackb.
EE. Surface of pronotum very uneven ...	*opacior*, Blackb.

TELMATOPHILUS.

T. sublautus, sp. nov. Elongato-ovatus; modice convexus; nitidus; setis subtilissimis parum manifestis sparsim vestitus; rufo-testaceus, antennarum articulis 9° 10° que et in elytris notulis indeterminatis 3 (his basali, mediana et anteapicali) picescentibus; capite convexo sat æquali sparsissime fortiter punctulato; prothorace transverso, antice quam trans basin sat angustiori, ad basin late sublobato, ante basin

*This character is inferred from Mr. Lea's description; I have not to my knowledge seen the insect.

transversim sulcato et utrinque foveolato, sparsim fortiter punctulato, lateribus ab angulis anticis ad medium divergentibus (hic angulatis, hinc ad basin subsinuatim convergentibus), angulis anticis obtusis posticis sat rectis; elytris vix striatis, seriatim punctulatis, puncturis suturam versus modicis (extrorsus gradatim magis grossis), interstitiis lævibus; antennis quam corporis dimidium paullo brevioribus, articulis basali suborbiculari 2° brevi 3° quam 2us angustiori fere duplo longiori 4°—8° brevibus 9° 10° que transversis sat magnis 11° obovato quam 10° paullo longiori; prosterno inter coxas minus lato, utrinque brevissime elevato; metasterno ad latera grosse sparsim punctulato; tarsis sat elongatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

This species is clearly congeneric with *T. Sharpi*, Blackb., which Dr. Sharp considered congeneric with his *Telmatophilus nitens* —from New Zealand. The only structural differences that I notice are the tarsi somewhat longer and more slender and the prosternum a little narrower between the coxæ. The infuscation of the elytra is diffused about the base and forms a vague fascia at the middle—much dilated on the lateral margin—and a dark cloud filling the apex. It is probable, however, that the markings are more or less variable; in the type they have a somewhat washed-out appearance. The eyes are a little less coarsely granulate than in *T. Sharpi*.

Victoria.

DERMESTIDÆ.

This family is very numerously represented in Australia, chiefly by very small species. It seems desirable, as some of the species that have been attributed to the older genera cannot be regarded as typical members of the same, to preface the following notes with a tabulated statement of the characters that I have regarded as governing the apportionment of the species to the various genera.

A. No ocellus on the forehead ... ... *Dermestes*
AA. An ocellus on the forehead.
B. The mesosternum narrow ... ... *Megatoma*
BB. The mesosternum wide, emarginate in front.
C. Femora and tibiæ strongly compressed
D. Basal joint of tarsi very short ... ... *Brachysphyrus*
DD. Basal joint of tarsi much longer than second joint ... ... *Adelaidea.*
CC. Femora and tibiæ normal.
D. Vestiture consisting of hairs
E. Sternal cavities lateral, sulciform ... *Trogoderma*
EE. Sternal cavities anterior, foveiform (antennal club 2-jointed) ... ... *Cryptorhopalum (1st section)*
EEE. Sternal cavities anterior, transversely sulciform (antennal club with more than 2 joints) ... ... *Cryptorhopalum (2nd section)*
DD. Vestiture consisting of scales ... ... *Anthrenus*

DERMESTES.

D. australis, Macl. Judged by the description this name may be confidently regarded as a synonym of the introduced *D. vulpinus*, Fabr. There seems to be no sufficient evidence of the occurrence of *Dermestes* in Australia except by accidental importation. I am not aware of this synonymy having been previously reported.

BRACHYSPHYRUS (gen. nov.).

Caput ocello instructum; palpi maxillares subcylindrici, articulo apicali quam præcedens sat longiori; antennæ breves, 11-articulatæ, articulis 1° 2° que subglobosis quam sequentes multo majoribus 3°—8° minutis 9°—11° (exempli typici) clavam formantibus (hac quam articuli ceteri conjuncti vix breviori, articulis 9° 10° que fortiter transversis, 11° quam 9us 10us que conjuncti vix breviori); oculi modici ovales; prothorax antice angustatus, postice lobatus; elytra postice singulatim rotundata, pygidium haud tegentia; prosternum medium carina longitudinali integra instructum, utrinque longe intra marginem lateralem fovea sat magna impressum; mesosternum latum antice processum prosternalem recipiens; femora lata subtus sulcata; tibiæ compressæ latæ extus spinulis parvis validis ciliatæ; tarsi modici, articulo basali minuto quam 2us multo breviori; coxæ anticæ permagnæ, prosterni marginem anteriorem fere attingentes; corpus pubescens.

The very large front coxæ, the position of the prosternal impressions (widely separated from the lateral margins of the segment), the very wide femora and tibiæ and the very small basal joints, are all unusual characters in the *Dermestidæ*. The narrow subcariniform interspace between the front coxæ is of similar structure to the same part in *Trogoderma*, &c., but the coxæ themselves nearly reaching the front margin of the segment, it also is similarly prolonged.

B. irroratus, sp. nov. Latissimus, fere subcircularis; subnitidus; nigro-piceus pube subtili minus perspicua fulva vestitus et maculis numerosis (his e pilis longioribus niveis formatis) irroratus, antennis pedibusque ferrugineis; supra crebre subtilius punctulatus; subtus pilis sat longis castaneis crebre vestitus. Long, 1½ l.; lat., 1 l.

The structural characters have been so fully specified above in the diagnosis of the genus that it seems unnecessary to repeat them here.

N. Queensland; Cairns (given to me by Mr. Koebele).

MEGATOMA.

I have before me an example from N. Queensland which must be referred to this genus. It is undoubtedly very close to *M. tenuifasciata*, Reitt., which appears to be the only Australian *Megatoma* hitherto described. The only objection I find to its identity with Reitter's species consists in its narrow elytral fascia being of zig-zag form, whereas Reitter calls it "Subrecta." This points to the probability of its being a distinct species—a probability increased by the remoteness from Queensland of Tasmania (Reitter's locality). Unfortunately my specimen is not in sufficiently good condition for me to be able to describe it satisfactorily.

TROGODERMA.

To a casual glance most of the Australian species of this genus appear scarcely distinguishable *inter se*, but a careful examination of their structure shows them to possess particulary satisfactory differential characters—chiefly in the antennæ and the prosternal sulci. I have found the latter to be the organs on which it is most convenient to base the primary divisions of the genus. These sulci are cavities for the reception of the antennæ in repose and always run the whole length of the prosternum immediately within its lateral margin on either side. Consequently the variations in the form of the sulci result from the nature of their *inner* and *hind* margins. In what seems to me the most highly developed form the sulci are very deep and narrow, the inner margin strongly defined and running obliquely from close to the inner margin of the eye to the hind angle of the prosternum where it meets the outer wall of the sulcus and closes its cavity. *T. Adelaidæ*, Blackb., and *varipes*, Blackb., furnish typical instances of the above form of sulcus. The development of the sulci however degenerates by their becoming wider, shallower, and less sharply limited. In some species (e.g. *apicipenne*, Reitter) the form of the sulci differs from that of the *Adelaidæ* group by their inner margin being in its front half nearly parallel to their outer margin and in its hind half (only) running obliquely across to join the outer margin at the hind angle of the prosternum. In other species, again (e.g. *difficile*, Blackb., and *lindense*, Blackb.), the inner margin of the sulcus reaches the basal margin of the prosternum at a point between the middle of the prosternum and the hind angle of the segment, the *basal margin* closing the sulcus by being slightly elevated, and finally there are species (e.g. *morio* and *maurulum*, Blackb.) in which the hind margin of the prosternum is not at all elevated, and consequently the hind end of the sulcus is open.

In my former notices of *Trogoderma* I have apportioned the species into primary divisions according as the sulci are open or

closed behind—calling all those sulci which are closed behind "sharply defined, deep," &c., without specifying more exact particulars. The study of more specimens and species has led me to the conclusion that such a classification is not satisfactory as it places in the first division one species *(lindense)* whose prosternal sulci are really more like those of the second division (because—and I think the observation was correct—its sulci are finely closed along their hind margin). This character, however, it is very difficult to be certain about unless a specimen is available for dissection, and therefore I now regard the species as grouped according to whether the inner margin of the sulcus ends on the hind margin of the prosternum at a distance from the hind end of the outer margin or ends *in contact with* the outer margin. This renders it neceseary to remove *lindense* from the first to the second group.

I observe, in all the Australian *Trogodermata* that I have examined, that the basal ventral segment has an oblique stria on either side not unlike those which are found in *Diplocœlus*. I do not find this character referred to in any diagnosis that I possess of *Trogoderma*, and am not able to say whether it is present in *Trogodermata* from other countries than Australia.

Tabulation of the Australian Trogodermata.

A. Elytra covering the hind body—not separately rounded at the apex.
  B. The inner margin of the prosternal sulci ends in contact with the outer margin.
    C. Elytra with erect comparatively long pilosity.
      D. Elytra with an antemedian red fascia ... *Froggatti*, Blackb.
      DD. Elytra with a red humeral spot ... *Reitteri*, Blackb.
      DDD. Elytra without defined antemedian red markings.
        E. General colour of elytra red.
          F. Antennal club of male eight-jointed and strongly pectinate ... ... *Macleayi*, Blackb.
          FF. Antennal club of male six-jointed and strongly serrate ... ... *tolarnense*, Blackb.
        EE. General colour of elytra black or dark piceous.
          F. Club of antennæ serrate (possibly pectinate in the unknown males).
            G. Club of antennæ of dark colour.
              H. First joint of antennal club in female very small and very strongly transverse ... ... *alpicola*, Blackb.
              HH. First joint of antennal club in female notably larger and less transverse ... ... *apicipennis*, Reitt.
            GG. Antennæ entirely testaceous ... *baldiense*, Blackb.
          *FF. Club of antennæ not serrate.
            G. Stipes of antennæ testaceous
              H. Puncturation of disc of pronotum comparatively sparse.

I. Joints 9 and 10 of antennæ scarcely transverse in male (female unknown) ... ... *eyrense*, Blackb.
II. Joints 9 and 10 of antennæ strongly transverse in both sexes ... ... *debilius*, Blackb.
HH. Puncturation of disc of pronotum very close ... ... *Adelaidæ*, Blackb.
GG. Antennæ entirely black ... *varipes*, Blackb.
CC. Elytra devoid of erect pilosity ... ... *exsul*, Blackb.
BB. The inner margin of the prosternal sulci ends on the hind margin of the the prosternum.
C. Elytra with a clearly defined testaceous antemedian fascia ... ... *longius*, Blackb.
CC. Elytra devoid of antemedian markings.
D. Antennæ and legs testaceous.
E. Form normally wide and oval.
F. Pronotum comparativeiy widely margined (size large)... ... ... *yorkense*, Blackb.
FF. Pronotum very narrowly margined (size very small) ... ... *lindense*, Blackb.
EE. Form extremely narrow and elongate . *singulare*, Blackb.
DD. Antennæ with at least the club dark.
E. Puncturation of disc of pronotum extremely sparse ... ... *difficile*, Blackb.
EE. Puncturation of disc of pronotum close.
F. Puncturation of elytra exremely close (almost confluent) ... ... *Meyricki*, Blackb.
FF. Puncturation of elytra much less close.
G. Antennal club of male eight-jointed.
H. Antennal club of female six-jointed ... ... *maurulum*, Blackb.
HH. Antennal club of female five-jointed ... ... *morio*, Er.
GG. Antennal club of male seven-jointed *antipodum*, Blackb.
AA. Elytra separately rounded, not covering hind body ... ... *occidentale*, Blackb.

T. tolarnense, sp. nov. Sat latum; sat parallelum; modice nitidum; supra pilis brevibus erectis vestitum; nigrum, elytris (his fusco-adumbratis) antennis pedibusque rufis; prothorace fortiter transverso, antice angustato, supra subfortiter sat crebre punctulato, angulis posticis retrorsum directis haud acutis; elytris sat crebre fortius punctulatis; metasterno antice lato subtruncato, prosterni sulcis latis profundis bene determinatis postice leviter clausis.

Maris antennarum clava 6-articulata, fortiter serrata. Long., 2 l.; lat., 1 l. (vix).

The red-brown elytra clouded with fuscous together with the entirely (except the basal joint) rufo-testaceous colour of the antennæ and their very strongly serrate six-jointed club render

*The male of *T. exsul*, Blackb., is not known but I feel sure that the club of its antennæ is not serrate.

the male of this insect—of which I have not seen the female—very distinct. The great width of its prosternal sulci and its serrate antennæ associate it with *T. Macleayi*, Blackb., which differs from it *inter alia* by the club of its antennæ in the male being—not merely serrate but—strongly pectinate, and eight-jointed.

N.S. Wales; Tolarno. Sent to me by Miss Carnie.

T. exsul, sp. nov. Late ovale; sat nitidum; supra pube subtili fulva depressa vestitum; nigrum, elytris versus apicem antennis (clava excepta) pedibusque rufo-testaceis; prothorace fortiter transverso, antice angustato, supra sat crebre minus subtiliter nec profunde punctulato, angulis posticis retrorsum leviter directis haud acutis; elytris crebre subfortiter punctulatis; metasterno antice lato, late rotundato; prosterni sulcis profundis, bene determinatis, postice clausis.

Feminæ antennarum clava 3-articulata. Long., 1 l.; lat., ½ l. (vix).

Although I have not been able to examine the male of this species, I have no hesitation in describing it, inasmuch as its vestiture—fine depressed fulvous pubescence—renders it extremely distinct among the Australian *Trogodermata*.

Central Australia.

T. debilius, sp. nov. Sat late ovale; sat nitidum; supra pilis brevibus erectis vestitum; nigrum, palpis tarsis et antennarum stipite testaceis, harum clava picescenti, elytris postice nonnihil rufescentibus; antennarum articulis 8°—10° sat transversis; prothorace valde transverso, antice angustato, supra sat leviter minus crebre punctulato, angulis posticis retrorsum directis sat acutis; elytris crebre sat fortiter punctulatis; metasterno antice lato, inter coxas intermedias late rotundato; prosterni sulcis profundis, bene determinatis, postice clausis.

Maris antennarum clava 5-articulata, articulis 8°—10° sat transversis nec quam longioribus duplo latioribus.

Feminæ antennarum clava 5 articulata quam maris multo breviori (præsertim articulo ultimo), articulis 8°—10° quam longioribus fere duplo latioribus. Long., 1⅔ l.; lat., ⅔ l.

The club of the antennæ in the male is very evidently longer than all the other joints together, in the female a little shorter than the other joints together. Among the species resembling this one in the form of their prosternal sulci and in their antennal club being black or nearly so in contrast with the testaceous stipes (which seems to be a perfectly reliable specific character) it is distinguished by the joints 8—10 of its antennæ being not so

excessively transverse as in *alpicola*, Blackb.; by its pronotum very evidently more feebly and sparsely punctulate than in *Adelaidæ*, Blackb., and by its size notably smaller, its form very much less parallel, its tibiæ and antennal club much more deeply black in colour and its elytra much less extensively rufescent towards the apex than in *eyrense*, Blackb.

W. Australia; Champion Bay (from Mr. E. Meyrick).

T. longius, sp. nov. Elongato-ovale; sat nitidum; supra pilis erectis vestitum; nigrum, elytris fasciis 2 testaceis (altera antemediana angulata, altera subapicali obliqua) ornatis, antennis (clava vix infuscata excepta) testaceis, pedibus plus minusve rufescentibus; prothorace fortiter transverso, antice angustato, in disco sparsissime (latera versus magis crebre) subtilius punctulato, angulis posticis retrorsum modice productis acutis; elytris leviter sat crebre minus subtiliter punctulatis; metasterno antice sat lato late rotundato; prosterni sulcis latis, modice profundis, male determinatis, postice apertis.

Feminæ (?) antennarum clava angusta, 4 articulata. Long, 1 l.; lat., ½ l. (vix).

This species is a very distinct one. It is the only *Trogoderma* known to me having a well defined coloured pattern on the elytra in combination with prosternal sulci open behind. The pilosity on the testaceous parts of the elytra is of testaceous colour, and there is also some thin whitish pilosity on the pronotum.

Victoria (Glenelg R.) and Tasmania.

T. lindense, Blackb. See notes on this species in the general remarks (above) on *Trogoderma*.

T. maurulum, sp. nov. Sat elongatum; sat nitidum; supra pilis brevibus erectis vestitum; nigrum, palpis tarsis et antennarum stipite testaceis; antennarum articulis 8°—10° valde transversis, quam longioribus duplo latioribus; prothorace fortiter transverso, antice angustato, supra crebre subfortiter punctulato, angulis posticis retrorsum directis sat acutis; elytris minus crebre sat fortiter punctulatis; metasterno antice minus lato, inter coxas intermedias angulato; prosterni sulcis male determinatis, postice apertis.

Maris antennarum clava 8-articulata; feminæ 6-articulata. Long., 1⅔ l.; lat., ⅔ l. (vix).

In some examples the tibiæ are piceous rather than black, and the knees even rufescent. The most distinctive character of this species and the next is the eight-jointed antennal club of the male. To a casual glance the antennæ seem to be all club, but on close examination it is seen that there is a single very small

testaceous joint—forming what I have called the *stipes*—between the two normally large basal joints—which may be said to form the scape of the antenna, the second of which is of testaceous colour—and the club. In the female the dilated joints (of black colour) forming the club begin with the sixth joint and the stipes consists of three testaceous joints—the second joint of the antennæ being also testaceous as in the male.

Victoria; Glenelg R. district.

T. (Megatoma) morio, Er. Reitter discusses this species in Verh. Ver. Brünn. (1881, p. 36) and is disposed to identify it with a *Trogoderma* that he had examined, and which he said agreed very well with Erickson's description except in being somewhat smaller than the size given for the type. As Erickson does not supply information regarding the structural characters of his species, his description would fit several species that are before me, but I have little doubt that one or other of them is *morio;* and as one of them is from Tasmania (Erickson's locality) I have no hesitation in fixing upon it to bear the name. It is extremely close to *T. maurulum*, Blackb., differing chiefly in the antennal character of the female. In the female of *maurulum* joints 2—5 are testaceous, 3 very evidently longer than 4, 4 a trifle longer than 5, 3—5 form the stipes, 6—11 are black and form the club. In *morio* joints 2—6 are testaceous, 3 if anything shorter than 4, 4 and 5 successively slightly shorter, 3—6 form the stipes, 7—11 are (not black but) reddish piceous and form the club. *T. morio* is a little narrower than *maurulum* with its sides straighter and more parallel.

THAUMAGLOSSA.

One species (*concavifrons*, Reitt.) has been doubtfully attributed by its author to Tasmania. He says of it "vaterland fraglich" and then suggests that it may be Tasmanian. It is an insect of black colour with some parts—including the head—red, the forehead deeply concave, and is unknown to me. The genus however occurs in Australia undoubtedly as a *Dermestid* now before me—from Queensland and N.S. Wales, and which agrees well with the description of *Anthrenus nigricans*, Macl.—is a member of it. Its ten-jointed antennæ in combination with cylindric tibiæ, elongate basal joint of the tarsi, toothed claws, and elytra separately rounded at the apex render it easy to identify. There is a very strong oblique stria on either side of the median part of the basal ventral segment.

CRYPTORHOPALUM.

The Australian *Dermestidæ* that have been attributed to this genus appear to me to represent two distinct genera. Reitter's descriptions of the three species that he attributed to the genus

unfortunately contain no information regarding the structure of the antennæ and of the prosternal sulci, without which it is impossible to identify with certainty the insects on which his descriptions were founded. I have before me, however, three species—from the localities cited in his memoir—which agree so well with his very full account of superficial characters that I regard their determination as not far short of certain. They, however, are decidedly not typical *Cryptorhopala*. Reitter says in a note that two of his species are superficially more like *Trogodermata* but he adds that their antennæ and antennal furrows are accordant with *Cryptorhopalum*. This seems unfavorable for my identification but does not change my opinion. The specimens that I identify with the two species referred to—*variabile*, Reitt., and *Erichsoni*, Reitt.—are of *Trogoderma* facies but their antennæ and antennal furrows are not those of typical species of either *Trogoderma* or *Cryptorhopalum*, but are like those of *Anthrenus*—i.e. the antennæ have their club less compact and more elongate than in *Cryptorhopalum*, and are received in sharply cut furrows placed transversely along the front margin of the prosternum. I am therefore of opinion that Reitter was incorrect in his observation of the antennal characters of these insects. I have no doubt that Reitter's three species belong to a genus not yet recorded—at any rate as Australian—but inasmuch as I am not sure that the genus may not have been described on examples from some other country—and many *Dermestid* genera are of extremely wide distribution—I do not propose a new name for it, but shall treat it for the present as a section of *Cryptorhopalum*. The Australian species of the genus hitherto described whose antennæ and prosternal sulci are typical are *australicum*, Blackb., *Woodvillense*, Blackb., *Quornense*, Blackb., and *interioris*, Blackb.; those having the antennæ and antennal furrows *Anthrenus*-like are *confertum*, Reitt., *variabile*, Reitt., and *australis* (*Anthrenus*), Hope. Beside the above there remains *C. obscurum*, Macl., on the description of which it is impossible to found any judgment; Macleay himself, however, expresses the opinion that the insect is not a true *Cryptorhopalum* and it is perhaps safe to assume that opinion to be correct. *C. Erichsoni*, Reitt, appears to be a synonym of *C.* (*Anthrenus*) *australe*, Hope.

I cannot find any conspicuous external characters distinguishing the sexes of the species of *Cryptorhopalum*. In the species of which I have seen numerous specimens, however, some are a little more elongate in form and have slightly more sparse puncturation than others; these I regard as males. Reitter does not refer to the sexual characters of his species beyond the remark in the description of *C. confertum* (which he describes as "subopacum")

that the prothorax of the female is "subnitidus." The sexual differences in the antennal club seem to be very slight; I specified what I took to be such a distinction in describing *C.* (?) (*Anthrenus*) *Flindersi* (=*confertum*, Reitt.), but really these differences are so small that they are hardly worth specifying especially as the antennæ are not easily examined satisfactorily unless they have been placed in position immediately after the death of the specimen. It might be supposed that among the *Cryptorhopala* which I have called the first section of the genus those with the club of their antennæ small were likely to be the females of those having large antennal clubs, but there are too many other differences among those before me for that to be the case, unless I have only one sex of each species; i.e., males of some species and females of others—which is not likely.

As the described species of *Cryptorhopalum* are now somewhat numerous a tabular statement of their distinctive characters seems to be called for. In providing it I have divided the species into two sections—the first containing species that seem to be typical members of the genus—the second containing the species referred to above as having antennæ and sternal cavities like those of *Anthrenus*.

It should be noted that abraded specimens are scarcely capable of being identified confidently unless in the case of a few species with well marked elytral pattern of colours. I have before me specimens from W. Australia (at least two species) and from Victoria which on account of their being more or less abraded I have not ventured to describe.

Tabulation of Species of Cryptorhopalum.

Section I. — True *Crytorhopala*, with two-jointed antennal club.

A. Antennal club large and circular.
  B. Elytra bicolorous, independently of the pubescence.
    C. Elytra traversed by a zone of blackish pilosity.
      D. Puncturation of elytra crowded and asperate ... ... *woodvillense*, Blackb.
      DD. Puncturation of elytra notably sparser and smoother ... ... *australicum*, Blackb.
    CC. Elytral pilosity entirely of pale colour *Eucalypti*, Blackb.
  BB. Elytra unicolorous, independently of the pubescence ... ... *quornense*, Blackb.
AA. Antenual club much smaller, and of oval or piriform shape.
  B. Puncturation of elytra considerably less close than in the following species ... *Casuarinæ*, Blackb.
  BB. Puncturation of elytra much closer.
    C. Puncturation of disc of pronotum scarcely less close and strong than of elytra ... ... *nealense*, Blackb.
    CC. Puncturation of disc of pronotum not at all as in C.

D. Puncturation of elytra asperate (colour of elytra almost uniformly castaneous) ... ... *ceciliense*, Blackb.
DD. Puncturation of elytra smooth (elytra black, with red markings) *interioris*, Blackb.

Section II.—Aberrant *Cryptorhopala*, antennal club with more than two joints.

A. The ashy pilosity of elytra in only two zones (antemedian fascia and basal spots) ... *confertum*, Reitt.
AA. The ashy pilosity in five zones (three fasciæ and basal and apical spots).
B. Elytra black ... ... *australe*, Hope.
BB. Elytra castaneous ... ... *variabile*, Reitt.
AAA. The ashy pilosity in four zones ... *quadrifasciatum*, Blackb.
AAAA. The ashy pilosity in three zones .. *terzonatum*, Blackb.

C. (*anthrenus*) *australe*, Hope. I have referred above to the probable identity of *C. Erichsoni*, Reitt., with this species, but as Hope's description is of very little value it seems necessary to state the reasons for my opinion, as follows: I have before me examples from Adelaide—Hope's locality—which are certainly conspecific with examples of a *Crytorhopalum* (Section II.) from Melbourne—Reitter's locality. These agree perfectly with Reitter's description of *Erichsoni*—though not so well (as noted above) with his subsequent note on the antennæ—and I have little doubt of their being that insect. Reitter describes quite satisfactorily the three fasciæ and basal and apical spots of whitish pilosity on the elytra and the spots on the pronotum—the latter distinct only in a very fresh specimen. Hope's description consists of only 17 words and as far as it goes perfectly describes specimens of the insect before me—both from Adelaide and Melbourne—which are not very fresh, but have lost some of the smaller patches of pilosity, mentioning the three fasciæ on the elytra and the lateral spots on the pronotum, but passing over the small pilose spots on the middle of the pronotum and the base and apex of the elytra. This may well have been either because Hope's type was somewhat abraded or in accordance with his evident custom of attaining brevity by limiting his description to the mention of a few leading particulars.

C. Casuarinæ, sp. nov. Elongato-ovale; sat nitidum; supra pilis cinereis vestitum; piceum, elytris castaneis utroque maculis 2 infuscatis (his longitudinaliter positis) indeterminatis ornato, antennis pedibusque rufotestaceis; prothorace fortiter transverso, antice angustato, supra subtilius sat crebre punctulato, angulis posticis (superne visis) retrorsum directis sat acutis; elytris minus crebre minus subtiliter punctulatis; prosterni sulcis ovalibus, ad latera positis; antennis sat abrupte clavatis, clava 2-articulata, articulo ultimo quam penultimus haud multo majori. Long., 1¼ l.; lat., ½ l.

The antennæ and their sulci in this species do not correspond satisfactorily with those of any other *Dermestid* known to me but they appear to be only a modification of those of typical *Cryptorhopala*. The club is two jointed, but it is very small for a *Cryptorhopalum* and is evidently longer than wide, the apical joint scarcely wider and not much longer than the penultimate. The sternal foveæ are as in other *Cryptorhopala* cavities to receive the *club* rather than the whole antennæ and are (not circular but) oval and placed further back than usual. The form of the body is very narrow and elongate for a *Cryptorhopalum*. The elytra are of a pale castaneous colour, each with two large faintly defined spots (darker than the general color) on the disc —one slightly behind the base, the other about the middle. In one example the elytra are very evidently (though not very much) less sparsely punctulate than in the type. I suspect it is the female, and the type a male.

Central Australia, on flowers of the Desert Oak (Casuarina).

C. ceciliense, sp. nov. Ovale; sat nitidum; supra pilis cinereis vestitum; rufo-ferrugineum, capite et in elytris notulis 2 indeterminatis piceis, antennis (harum clava vix infuscata) pedibusque testaceis; antennis abrupte clavatis clava 2-articulata ovali (articulo apicali quam penultimus manifeste latiori sat longiori); prothorace fortiter transverso, antice angustato, supra subtiliter minus crebre punctulato, angulis posticis (superne visis) retrorsum directis sat acutis; elytris confertim subtilius subaspere punctulatis; prosterni sulcis ovalibus. Long., 1 l.; lat., ½ l. (vix).

The colors and markings of this species are much like those of the preceding (*casuarinæ*) except that the prothorax is rufous. The club of the antennæ is much larger (though still small for a *Cryptorhopalum*), with the apical joint considerably more notably larger than the preceding joint. The pronotum is more finely and the elytra are very much more closely punctured. The form of the body is much less narrow and much more oval. I cannot regard these differences as sexual. If they were so the larger antennæ would probably indicate the male, but the form and puncturation accompanying the larger antennæ would be much more likely to belong to the female.

Central Australia (Cecilia Creek).

C. nealense, sp. nov. Ovale; sat nitidum; supra pilis cinereis vestitum; piceo-nigrum, elytris obscure rufescentibus fasciis 2 latis piceo-nigris (altera ad basin, altera vix pone medium, positis) ornatis, antennarum stipite tibiis tarsisque sordide testaceis; antennis abrupte clavatis, clava 2-articulata ovali (articulo apicali quam penultimus parum latiori multo

longiori); prothorace fortiter transverso, antice angustato, supra crebre subfortiter (fere ut elytra) punctulato, angulis posticis retrorsum leviter directis modice acutis; elytris crebre subfortiter punctulatis; prosterni sulcis ovalibus. Long., 1½ l.; lat., ⅜ l.

The most apparent character of this species is the strong puncturation of its pronotum, which is almost identical in character with that of the elytra. The club of the antennæ is still larger than that of *C. ceciliense* being of about average size among the Australian *Cryptorhopala* but it still retains the oval form as in the preceding two species. The stipes of the antennæ is stouter than in the preceding two species, with its apical joint more evidently dilated but not nearly sufficiently so to be recognised as a part of the club.

Central Australia (Neale River).

C. Eucalypti, sp. nov. Late ovale; sat nitidum; supra pilis cinereis vestitum; nigrum, elytris (parte basali fere tertia excepta) rufis pone medium obsolete fusco-fasciatis, antennis pedibusque testaceis; antennis perabrupte clavatis, clava magna circulari 2-articulata, articulo apicali quam penultimus valde majori; prothorace fortiter transverso, antice angustato, supra minus crebre subobsolete punctulato, angulis posticis retrorsum directis sat acutis; elytris confertim subfortiter punctulatis; prosterni sulcis circularibus. Long., 1 l.; lat., ½ l. (vix).

The antennæ and sternal cavities of this species are those of a typical *Cryptorhopalum;* among its congeners presenting these characters it is the only one known to me having bicolorous elytra with their pilosity unicolorous.

Central Australia; Oodnadatta.

C. (?) quadrifasciatum, sp. nov. Ovale, minus latum; minus nitidum; supra pilis cinereis vestitum, his in elytris fascias basalem apicalem et 2 dorsales formantibus; nigrum, antennis pedibusque ferrugineis; antennarum clava sat elongata, 3-articulata; prothorace fortiter transverso, antice angustato, supra subtilius sat crebre punctulato, angulis posticis retrorsum directis sat acutis; elytris confertim sat aspere subfortiter punctulatis; prosterni sulcis ut *Anthreni* (anticis, transversim positis). Long., 1¼ l.; lat., ⅝ l.

Easily distinguishable from its immediate allies by the ashy pilosity of its elytra being placed in four zones—basal, antemedian, postmedian, and apical.

Central Australia; Oodnadatta.

C. terzonatum. sp. nov. Ovale; minus latum; sat nitidum; supra pilis cinereis ornatum, his in pronoto latera versus

condensatis et maculas 3 (2 discoidales, 1 in lobo postico) formantibus, in elytris fasciam antemedianam macularem (hac suturam haud attingenti) maculam postmedianam lateralem et maculas 2 anteapicales (his transversim sitis) formantibus; piceum, antennis pedibusque ferrugineis, ; antennarum clava 3-articulata; prothorace fortiter transverso,antice angustato, subtiliter minus perspicue punctulato, angulis posticis retrorsum directis sat acutis; elytris squamose vix aspere (sed apicem versus asperrime) punctulatis; prosterni sulcis ut *Anthreni* (anticis, transversim positis). Long., 1 l.; lat., $\frac{3}{10}$ l.

This very small insect belongs to what I have called Section II of *Cryptorhopalum*. It is easily distinguishable from the others of the same section by the disposition of the white pilosity of its upper surface which forms an ante-median fascia touching the lateral margins and widely interrupted on either si le of the suture, a small spot on either side close to the lateral margin, and a row of four spots placed arcuately across the elytra a little before the apex.

Queensland; Townsville (Mr. F. P. Dodd).

ANTHRENUS.

Of the seven species found in Australia that stand under this name only three are correctly placed there—viz., *ocellifer*, Blackb. and the two introduced species *varius*, Fab., and *museorum*, Linn. I may say in passing that likely as *museorum* is to occur in Australia I have no evidence of its occurrence beyond its mention in Masters' Catalogue; all the *Anthreni* that I have seen bearing the name are *varius*, Fab.—which is the great pest of Australian museums. *A. nigricans*, Macl, is (as noted above) a *Thaumaglossa*. *A. australis*, Hope, and *Flindersi*, Blackb., belong to the aggregate which I have treated provisionally above as a section of *Cryptorhopalum*, but which undoubtedly represents a distinct genus intermediate between *Cryptorhopalum* and *Anthrenus*, having the vestiture of the former and antennæ and antennal cavities as in the latter. As already noted I refrain from founding a new genus for them only because I am not sure that a name may not have already been given to congeners from some other country. I have chosen *Cryptorhopalum* for their temporary location because most of them have already been placed there by Reitter. *A Flindersi*, Blackb., is I think a synonym of *Cryptohopalum confertum*, Reitt. Owing to its antennal structure I did not (when I described it) consider the possibility of its having been previously described as a *Cryptorhopalum*. *A. socius*, Lea, is certainly not an *Anthrenus*, its vestiture being described as consisting of hairs, Lea does not

give sufficiently exact details of the antennal cavities, tarsal structure, &c., to allow of much more than a guess as to the genus of his insect—but the details he gives are inconsistent with its being an *Anthrenus* or a *Cryptorhopalum* or congeneric with the species referred to above as intermediate between those two genera. I suspect it is a *Trogoderma*. *A. australis*, Hope, is fully discussed above under *Cryptorhopalum*.

BYRRHIDÆ.

MORYCHUS.

I find that I was in error in (doubtfully) attributing to *Byrrhus* the two species which I described under the names *B. torrensensis* and *B. raucus*. The original specimens of the former were much encrusted with some extraneous matter and the examination of subsequently captured examples has satisfied me that the position of the tarsi—laid back against the tibiæ—which led me to associate the species with *Byrrhus* was due to this extraneous matter having made them cohere to their tibiæ. *B. torrensensis* therefore should be transferred from *Byrrhus* to the allied genus *Morychus*. It is a winged insect and its tarsi are devoid of well-defined lamellæ on the undersurface, being very similar to the tarsi of the European *M. æneus*, Fab. The other species referred to (above) is discussed in the following note.

PEDILOPHORUS.

Byrrhus raucus, Blackb., belongs to *Pedilophorus*—which Lacordaire and Erichson regard as a subgenus of *Morychus*—being wingless and having a very long lamella under the third joint of its hind tarsi. In Masters' Catalogue *Morychus heteromerus*, King, is referred to *Pedilophorus*—I suppose either because it has been ascertained to belong to that aggregate as distinguished from the typical form of *Morychus* (I do not think any note to that effect has been *published)* or on the ground that *Pedilophorus* as a name has priority over *Morychus*. It certainly is the older name but Lacordaire objected to it on the ground that it was founded on a specific rather than a generic character. I hesitate to regard this as a valid reason for discarding the claim of the name to priority—but I see no reason why both names should not stand as the differences between the respective insects to which they are applied seem to be well marked and important. Regarding *Morychus heteromerus*, King, I am in some perplexity. The description of it is most unsatisfactorily brief, but it is certainly very distinct from all the *Byrrhidæ* known to me. If King's statement that its tarsi are heteromerous is not an error of observation I should expect to find that it is not really a *Byrrhid*.

MICROCHÆTES.

The number of species that have been attributed to this genus is six, but only four of them seem to be rightly placed there. *M. costatus*, Macl., is stated by its author to represent in all probability a new genus and its description does not read at all like that of a *Microchætes*. *M. minor*, King, is described as having tetramerous tarsi—which at once removes it from this genus—and its very small size and upper surface devoid of fascicles render it very unlikely to be a *Microchætes* even if its author was mistaken about the number of joints in its tarsi. Of the remaining four species the description of *M.* (*Byrrhus*) *australis*, Boisd., is perfectly useless and would fit any member of the genus that I have seen—except perhaps a species described below which is differently colored—while *M. sphæricus*, Hope, could certainly not be identified with confidence except by examination of specimens from the original locality—Western Australia; the few characters mentioned are found in several species before me. Thus there are only two known species of which any serious count can be taken as being intelligibly described, viz., *M. scoparius*, Er., and *fascicularis*, Macl. The former of these two is known to me, while the description of the latter mentions a row of *five* fascicles behind the transverse furrow on the pronotum—a character that distinguishes it from all that I have seen of the genus. I have, however, some specimens kindly given me by Mr. Lea under the name of *fascicularis*, Macl., and presumably named by comparison with the type—but they have only the *four* fascicles attributed to *M. sphæricus*, Hope, and present in several of the species before me. The presence of a fifth fascicle on the row on the pronotum would be a remarkable character as it would have to be on the centre line of the segment and consequently would interrupt the smooth dorsal space that exists in even the most strongly tuberculate of the species before me. The following is a tabular statement of the characters of the species known to me.

A. Elytra with fascicles between the seventh interstice and the lateral margin.
  B. Puncturation of metasternum coarse in front but much finer behind ... ... *fascicularis*, Macl.?
  BB. Puncturation of metasternum even or nearly so.
    C. Puncturation of metasternum extremely coarse ... ... *solidus*, Blackb.
    CC. Puncturation of metasternum very much finer ... ... *scoparius*, Er.
AA. No fascicles on the elytra beyond the fifth interstice ... ... *nigrovarius*, Blackb
AAA The seventh interstice of the elytra is the last fasciculate interstice ... ... *coloratus*, Blackb.

M solidus, sp. nov. Latus; convexus; nitidus, sed indumento opaco squamoso tectus; piceo-niger, sed indumento cinerascenti; supra setis erectis castaneis vestitus, his hic et illic condensatis (partim in tuberculis partim in superficie dorsali positis); prothorace valde transverso, antice fortiter angustato, supra in parte mediana antica sat fortiter compresso-elevato, trans medium profunde sulcato, pone sulcum transversim 4-fasciculato; elytris striatis, interstitiis convexis, passim (parte apicali sexta excepta) sat crebre tuberculatis et fasciculatis; sternis et coxis posticis grosse sat crebre sat æqualiter punctulatis. Long., 2 l.; lat., 1½ l.

As I have only one specimen of this insect I have not subjected it to the removal of the indumentum covering its upper surface. It is, however, distinguishable from all the others before me by—in combination—its dark under surface, its elytra having their whole surface except the extreme apex studded with confused tubercles and fascicles of castaneous setæ, and its sterna and hind coxæ extremely coarsely and somewhat evenly punctulate. A small abrasion of the indumentum on the elytra reveals the surface as crenulate-striate with strongly and roundly elevated interstices. The fascicles and tubercles of the elytra are so distributed that when the insect is looked at from behind there seems to be a very deep wide furrow across the elytra somewhat behind the middle. It is allied to *M scoparius*. Er., and to the species sent to me by Mr. Lea as *fascicularis*, Macl., but differs from both of them by, *inter alia*, the striæ of the elytra being crenulate and their interstices strongly convex the very coarse even puncturation of the sterna, &c.

Queensland.

M. nigro-varius, sp. nov. Ovalis; minus latus; sat convexus; subnitidus; piceo-niger, sed squamis opacis cinereis dense vestitus, antennis pedibusque plus minusve dilutioribus; supra setis erectis nigricantibus et nonnullis castaneis hic disperse illic fasciculatim ornatus, nullo modo tuberculatus; prothorace valde transverso, antice fortiter angustato, supra in parte mediana antica minus fortiter compresso-elevato, trans medium late leviter sulcato crebre minus fortiter punctulato haud fasciculato; elytris sat fortiter punctulato-striatis, puncturis in striis sat grossis, interstitiis subtilissime punctulatis suturam versus planis extrorsum gradatim magis convexis (2° postice, 3° antice 5° toto fasciculas elongatas et nonnullas quadratas ferentibus; sternis et coxis posticis confertim minus fortiter sat æqualiter punctulatis. Long., 1⅜ l.; lat., 1 l.

Until the squamose indumentum has been removed the sculpture of this species is scarcely discernible, although the

elytra appear finely striate, the striæ scarcely punctulate. The fascicles of setæ are confined to the elytra where they have a dark velvety appearance. On the second interstice there are two or three quadrate fascicles considerably behind the middle, on the front two-thirds of the third interstice two or three elongate fascicles, on the fifth insterstice two elongate and two quadrate fascicles placed alternately. Differs from all its congeners known to me by the fascicles of erect setæ being entirely confined to the inner half of each elytron.

S. Australia.

M. coloratus, sp. nov. Latus; convexus; minus nitidus; piceo-niger, sed indumento squamoso opaco tectus, corpore subtus pedibus et nonnullorum exemplorum elytris latera versus rufis; supra setis erectis vestitus, his hic et illic condensatis (partim in tuberculis partim in superficie dorsali positis); prothorace valde transverso, antice fortiter angustato, supra in parte mediana antica sat fortiter compresso-elevato, trans medium late leviter sulcato, pone sulcum transversim obsolete tuberculato-fasciculato; elytris crenulato-striatis, interstitiis vix convexis (3°, 5°, 7° que pone medium obtuse vix tuberculatis, fasciculis in interstitiis 2°—7° positis; sternis minus crebre (coxis posticis magis crebre) sat fortiter punctulatis. Long., 1⅝ l; lat., 1¼ l. (vix).

The second elytral interstice bears a moderately large fascicle considerably behind the middle and a very small one still nearer the apex—between these last two there are some whitish scales in very fresh specimens; the third interstice has a small basal fascicle, about three small fascicles almost confluent ending with about the first quarter of the interstice, a small one somewhat in front of the middle, about seven small subconfluent ones ending a little behind the middle, a scarcely perceptible one considerably behind the middle and a well defined one near the apex; the fourth interstice has a scarcely defined fascicle at the top of its hind declivity; on the fifth interstice there is a moderate then a small then a large then a small fascicle, beginning a little in front of and ending considerably behind the middle—the hindmost fascicle of the third interstice might be reckoned as belonging to this series as the third and fifth interstices coalesce behind; the sixth interstice has a scarcely defined fascicle near the apex; the seventh interstice has a large fascicle near the top of its hind declivity and a smaller one still further back and the eighth interstice is like the sixth. These fascicles seem constant in perfectly fresh specimens; in specimens not quite fresh the fourth, sixth, and eighth interstices are devoid of any trace of fascicles. The tubercles of the elytra are only visible in abraded

specimens and are merely slight increases on a short space—behind the middle—in the width and convexity of the third fifth and seventh interstices. The red colouring of the under-surface and legs together with the dark coloring—except a patch of whitish scales about the top of the hind declivity of the elytra in non-abrabed specimens—distinguishes this species readily. Otherwise it differs from its described congeners as follows, *inter alia*—from *nigro-varius*, Blackb., by the presence of fascicles on the external half of each elytron, from *solidus*, Blackb., by the considerably finer and less close puncturation of the sterna, from the species referred to above as *fascicularis*, Macl.?, by its prosternum being very much more closely punctulate than its metasternum, and from *scoparius*, Er, by there being no well defined fascicles on its elytra outside the seventh interstice and by the coarse crenulation of its elytral striæ.

S. Australia; Eyre's Peninsula, in seaweed.

HETEROCERIDÆ.

Australian species of two genera appertaining to this Family are known—the old widely distributed genus *Heterocerus* and *Elythomerus* (founded by Mr. C. O. Waterhouse for a Queensland species) differing from *Heterocerus inter alia* by its contiguous front coxæ. I have not seen an example of the latter.

HETEROCERUS.

Of this genus Australian species have been described under six names, on which notes will be found below together with descriptions of two new species. The *Heteroceri* are most difficult to deal with on account of their extremely close superficial resemblance *inter se* and their liability to variation in colour and markings. The most satisfactory distinctive characters seem to be sexual. Unfortunately the description of the species first recorded as Australian—*H. Mastersi*, Macl.—does not mention a single really specific character. The description (next published) of *H. Australasiæ*, Waterh., is defective in the omission of any information as to the sex of the specimen described, and its sexual characters if it was a male. I have taken a species on the banks of the Murray which may possibly be a variety of it, and which therefore I forbear to describe as new. I do not find any clearly defined discrepancy between this S. Australian species and Waterhouse's description except that the latter indicates the sutural infuscation as confined to the hinder half of the elytra while in the former it attains the base and is much dilated in the scutellar region where it is at its darkest. I take my two specimens to be male and female, the one having the head narrower than the other, with the clypeus strongly—in the other less strongly—emarginate in front and furnished with two teeth

so minute as to be only noticeable when carefully looked for—of which I cannot find any trace in the other. This species resembles *H. multimaculatus* in outline but its elytra are much more finely punctured—more finely indeed than in any other of the *Heteroceri* before me. For the determination of the Australian species of this genus I have found the number of spines on the external margin of the front tibiæ a valuable and invariable character. All of them known to me belong to the section of the genus having the base of the pronotum more or less margined, and I do not find in any of those of which I can positively identify the male any peculiarity likely to be sexual in the arched ridge of the basal ventral segment. On the other hand all the specimens that seem to be decidedly males have good sexual characters on the head. The following tabular statement of the most conspicuous distinctions among the species known to me is ot altogether satisfactory inasmuch as I have had to rely upon the coloring to distinguish *Victoriæ*, Blackb., from two allied species. There are other differences, however, which do not lend hemselves to tabulation and I do not doubt that the male of *Victoriæ*—unknown to me—has well-defined frontal characters. The descriptions of *H. Mastersi*, Macl., and *Australasiæ*, Waterh., do not supply the information that would enable me to place them in this tabulation. I may add that the striation of the elytra seems to be in this genus quite unreliable for the determination of species. I have specimens with evident striation taken in company with—and showing no other difference from—specimens whose elytra are non-striate.

A. Front tibiæ with 9 to 10 external spines
  B. Elytra finely and closely punctulate.
    C. Form narrow and elongate; elytra conspicuously narrowed behind the shoulders — *multimaculatus* Blackb.
    CC. Form normal
      D. The light coloring of the elytra not reaching base except on lateral margin
        E. Clypeus of male with two very short slender spines in front between which the outline is not emarginate — *Flindersi*, Blackb.
        EE. Clypeus of male with two blunt teeth in front between which the outline is emarginate ... ... — *indistinctus*, Blackb.
      DD. A subsutural vitta of light colour reaches the base of the elytra ... — *Victoriæ*, Blackb.
  BB. Elytra much more strongly punctulate than in the other species ... ... — *largensis*, Blackb.
AA. Front tibiæ with less than nine external spines ... ... — *debilipes*, Blackb.

H largensis, sp. nov. Robustus; modice elongatus; sat nitidus; setis erectis sat elongatis vestitus; niger, antennarum basi mandibulis prothoracis lateribus elytris (notulis nonnullis

piceis exceptis) tibiis tarsis et abdominis lateribus rufo-brunneis; capite pronotoque opacis confertim subtiliter punctulatis; hoc postice marginato, ad latera minus fortiter rotundato; elytris sat fortiter subrugulose punctulatis (exempli typici) substriatis, pone humeros parum angustatis; tibiis anticis 10-spinosis.

Maris clypeo antice dentibus 2 parvis acutis armato, inter dentes sat profunde emarginato. Long., 2 l.; lat., $\frac{4}{5}$ l.

Fem. latet.

This species is very distinct from all its congeners known to me by the considerably longer pubescence of its upper surface and the much stronger puncturation of its elytra. The piceous marks on the elytra are—in the type—a small blotch round the scutellum, and on each elytron two elongate basal blotches between the scutellum and the lateral margin an irregular oblique median blotch and a post-median blotch resembling roughly the letter U with its convexity directed forward. The teeth on the front of the clypeus of the male, though not actually large are decidedly larger than those of *H. indistinctus*, Blackb., and are well elevated with a sharp free point directed forward above the labrum, while in *indistinctus* they are mere angular extensions of the outline of the clypeus scarcely raised above the surface of the labrum. The corresponding projections in *Flindersi*, Blackb., are very short and slender *spines*, while in *debilipes*, Black. —described below—they are more like those of the present species but somewhat smaller and less sharply pointed forward.

S. Australia (bank of a Creek near Largs Bay.)

H. debilipes, sp. nov. Sat elongatus; sat convexus; pone humeros parum angustatus; minus nitidus; pube brevi erecta vestitus; obscure ferrugineus vel picescens, antennis palpis mandibulis pedibusque testaceis, elytris testaceo-brunneis notulis nonnullis piceis ornatis; capite pronotoque opacis confertim subtilissime punctulatis; hoc postice sub tiliter marginato, ad latera fortiter rotundato; elytris subtiliter confertissime subasperatim punctulatis, vix vel nullo modo striatis; tibiis anticis 8-spinosis.

Maris clypeo profunde subtriangulariter emarginato, antice bidentato, dentibus laminas compressas erectas nonnihil simulantibus.

Feminæ clypeo haud dentato. Long. $1\frac{1}{2}$ l; lat., $\frac{3}{5}$ l.

The distinctive characters of this species seem to be—small size, convex subcylindric form, extremely close elytral puncturation, extremely deep emargination of the front of the clypeus (best seen when viewed obliquely from in front) and small number of spines on the front tibiæ. The puncturation of the elytra is

closer than in any other Australian *Heterocerus* known to me except that mentioned above as possibly *H. Australasiæ*, Waterh., in which the puncturation is somewhat closer and correspondingly finer but not at all asperate. The small number of spines on the front tibiæ is constant in the five specimens that I have seen and is certainly a reliable character. The clypeal processes of the male are larger than in the other species of which I know the male with certainty except *H. largsensis*, Blackb. They have somewhat the appearance of small compressed laminæ projecting from the front of the clypeus with their front face vertical and their upper outline forming an exact right angle with their front outline—viewed from the side—but not actually *toothed*. As, however, with sexual characters of this description in many other insects, there is a certain degree of variability in the size and sharpness of outline in this structure. The dark markings on the elytra (fairly constant on the specimens examined) are—one round the scutellum, two between the scutellum and the lateral margin (these, confluent on the base), a transverse median irregular (in some examples interrupted) blotch, and a zig-zagged transverse post-median blotch which is connected at its inner extremity with the inner extremity of the median blotch by a subsutural line.

Central Australia.

H. multimaculatus, Blackb. The type of this insect which is still unique is apparently a female; its clypeus resembles that of the female of *H. debilipes*, Blackb., from which it differs by its larger size, different markings, much less close elytral puncturation, more elongate form—with elytra narrowed behind the shoulders—and more numerous tibial spines. In my description of it I called the puncturation of its elytra "much" closer than in *H. Flindersi*, Blackb.; but I think the phrase was somewhat too strong, and "evidently" should be substituted for "much."

H. Flindersi, Blackb. The type of this insect is a female. I have subsequently found the male, the sexual characters of which have been indicated above under the heading of *H. largsensis*, Blackb., and also in the tabulation. In my experience the commonest and most widely distributed Australian *Heterocerus*.

H. indistinctus, Blackb. The sexual male characters of this species are indicated above under the heading of *H. largsensis*, Blackb., and also in the tabulation.

H. Victoriæ, Blackb. My two examples of this insect appear to be females. The clypeus is widely and decidedly emarginate in front and the labrum only feebly convex. The markings of the elytra are very distinct from those of the other Australian *Heterocerí* known to me.

BUPRESTIDÆ.

PARACUPTA.

P. bellicosa, sp. nov. Elongato-oblonga, sat angusta; capite nigro-viridi; pronoto nigro-violaceo, ad latera sulco lato aureo-viridi impresso; elytris nigro-viridibus, sutura indeterminate violacea, sulco sublaterali aureo-viridi ad apicem vix abbreviato impresso; corpore subtus aureo-viridi; antennis violaceis; pedibus aureo-viridibus; partibus impressis (capitis prothoracisque sulco mediano excepto) pube subtili flava confertis; capite longitudinaliter concavo, sat grosse subrugulose punctulato; prothorace leviter transverso, a basi antrorsum continue angustato, sparsius minus fortiter punctulato, sulco longitudinali mediano integro impresso, lateribus fere rectis; scutello sat parvo; elytris haud costulatis, subtiliter subseriatim (inter sulcum sublateralem et marginem magis fortiter vix seriatim) punctulatis, interstitiis sparsim subtiliter punctulatis, sutura pone scutellum alte depressa, lateribus in parte postica tertia dentibus sat magnis circiter 8 marginatis, sutura ad apicem spiniformi; prosterno medio postice longitudinaliter sulcato fere lævi, antice grosse minus crebre punctulato, prosterno alibi irregulariter (hic confertim subtiliter, illic sparsim grosse) punctulato; metasterno medio sparsim grosse (alibi confertim sat subtiliter) punctulato; coxis posticis intus sparsissime extus confertim, abdomine medio sparsissime partibus lateralibus confertim, punctulatis; segmentis ventralibus latera versus late impressis et flavo-pubescentibus.

Maris (?) segmento ventrali apicali late profunde feminæ (?) anguste minus profunde emarginato. Long. (maris ?) $8\frac{1}{2}$ l. (feminæ ?) $11\frac{1}{2}$ l.; lat. (maris ?) $2\frac{2}{3}$ l. (feminæ ?) $3\frac{2}{3}$ l.

The nearest previously described Australian species in respect of markings is *P. albivittis*, Hope, from which, however, the present insect is extremely distinct. In form it is much narrower and more acuminate behind; the head and pronotum are much less closely and more finely punctulate; the median longitudinal sulcus of the pronotum is entire, wide, and deep; the serration of the hind part of the lateral margin of the elytra is much stronger, and their lateral vitta is continuous to the base, &c., &c. I suppose there can be little doubt that the smaller specimen with its apical ventral segment more deeply emarginate is the male.

N. Queensland; sent by Mr. C. French.

APPENDIX.

The following two species have come under my notice while the preceding pages were going through the press.

CUCUJIDÆ.

LÆMOPHLŒUS.

L. Victoriæ, sp. nov. Mas. Elongatus; sat angustus; sat parallelus; nitidus; subpubescens; rufo-ferrugineus, elytris ante apicem transversim infuscatis; capite quam prothorax vix angustiori, sat convexo, vix inæquali, subtiliter crebrius punctulato, clypeo antice leviter subrotundato; antennis quam corpus haud brevioribus, articulis 9°—11° quam ceteri sat longioribus (inter se sat æqualibus, quam latioribus multo longioribus); prcthorace quam longiori paullo latiori, postice vix angustato, supra crebre minus subtiliter punctulato, utrinque unistriato, lateribus parum arcuatis, angulis anticis (superne visis) vix bene definitis nullo modo extrorsum directis posticis sat acute rectis; elytris (certo adspectu) striis dorsalibus 3 (ut *L. ferruginei*, Steph.) impressis, latera versus tenuiter carinatis, interstitiis punctulatis.

Feminæ capite angustiori, antennis quam corpus paullo brevioribus. Long., 1 l.; lat, $\frac{3}{10}$ l.

In the tabulation of *Læmophlœus* (above) this species falls beside *L. Lindi*, Blackb., from which it differs *inter alia* in its antennæ—those of the male being fully as long as the body, and those of the female quite three-quarters of the length of the body. As it is just possible that I have not seen the male of *Lindi* it should be noted that the antennæ of the female of this species are much longer than those of the female of *Lindi*, with the apical three joints very much more elongate. The front angles of the prothorax are slightly more defined than those of *L. Lindi* (and *L. ferrugineus*, Steph). The following species of those not known to me may possibly have front angles of prothorax not unlike those of the present species; therefore I note that in that case the present species differs *inter alia* from *L. conterminus*, Olliff, by its much less transverse prothorax, from *L. contaminatus*, Gr., by its testaceous antennæ, from *L. Leachi*, Gr., by the very elongate terminal joints of its antennæ.

Victoria (sent by Mr. French).

SILVANUS.

S. similis, Wesm. Mr. French has sent me for determination an example (from P. Mackay, Queensland) of a *Silvanus* which I cannot separate specifically from this European insect. It has not been previously recorded as Australian.

TRANSACTIONS

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INCLUDING PROCEEDINGS AND REPORTS.

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Descriptions of New Genera and Species of Australian Lepidoptera.

By Oswald B. Lower, F.E.S. (Lond.), &c.

[Read June 2, 1903.]

BOMBYCINA.

LASIOCAMPIDÆ.

Opsirrhina cyclomela, n. sp.

Male and female, 60-120 mm. Head, face, thorax, and legs deep mahogany-red, all tarsi suffusedly ringed with dull ochreous-whitish, posterior tibiæ ochreous. Antennæ fuscous, pectinations ochreous. Abdomen yellow above, with broad black segmental bands, beneath mahogany-red. Forewings elongate, triangular, termen obliquely rounded; deep mahogany-red, more or less irrorated with dull whitish scales, especially in female; four obscure, similar dull fuscous moderate, curved, fasciæ; first from one-sixth costa to about one-fourth innermargin; second parallel beyond; third from costa in middle to middle of innermargin; fourth parallel beyond; a curved row of more or less connected fuscous spots from costa at four-fifths to anal angle; a dull fuscous discal spot; all these markings sometimes absent, especially in female; cilia mahogany-red. Hindwings with termen strongly rounded; deep mahogany-red, strongly mixed with yellowish along innermargin and at base; lines as in forewings, but first two hardly traceable; cilia as in forewings.

This fine insect is apparently undescribed, and at Dr. Turner's suggestion I am doing so. The female is a very heavily built insect and much liable to become greasy.

Cooktown and Duaringa, Queensland; several specimens from late Mr. G. Barnard taken in March

GEOMETRINA, HYDRIOMENIADÆ.

Hypycnopa, n. g.

Face with small cone of scales. Palpi short, porrected. Antennæ in male bipectinated throughout. Posterior tibiæ with all spurs present. Forewings with areole double; 12

free, vein 6 sometimes out of 9 Hindwings with patch of modified yellow scales; 6 and 7 stalked.

Type, *delotis*, Low.

Somewhat allied to *Xanthorhœ*, Hb., on the one hand, but with some reversionary tendency to *Melitulias*, Meyr.

HYPYCNOPA DELOTIS, n. sp.

Male and female, 23-25 mm. Head, antennæ, thorax, legs and abdomen ashy-grey-whitish. Antennal pectinations at greatest length 6, abdomen banded with blackish, tibiæ and tarsi obscurely ringed with whitish. Forewings elongate, triangular, termen entire, oblique; ashy-grey-whitish, finely strigulated throughout with transverse blackish lines; markings black; a fine curved transverse line near; edges of median band limited by fine lines; anterior from one-third costa to one-third innermargin, gently curved, anteriorly edged by a dull whitish band, containing a fine line of fuscous throughout; posterior edge from two-thirds costa to two-thirds innermargin, waved throughout, with a moderate bidentate projection in middle, sinuate above and below this, and with a slight indentation on fold; a transverse line, thicker on lower half, from costa in middle of median band, thence inwardly oblique to innermargin and there coalescing with anterior edge of band, forming a thick streak, followed by a parallel line just beyond; a short oblique streak from just beneath apex and reaching a fine waved double subterminal line; a row of elongate black streaks along termen; cilia fuscous with a dark median line. Hindwings with termen very faintly waved; whitish fuscous, with faintly waved transverse fuscous lines; edges of median band only discernible on innermargin; a postmedian transverse fuscous line, followed by a parallel, but more waved fuscous line; an elongate patch of yellow scales below costa in middle, absent in female; cilia greyish-fuscous.

Recalls *Phrissogonus insigillatus*, Walk., especially the female.

Broken Hill, New South Wales, male; Birchip, Victoria, female; both taken in April. The latter specimen taken by Mr. D. Goudie.

MESOPTILA ANTHRACIAS, LOW.

(P. L. S., N.S.W., 1897, p. 12.)

I submitted a specimen of this insect to Sir Geo. Hampson, who informs me that it is not referable to the *Geometrina*, but to the *Noctuina* in the genus *Raparna*, so that the remarks in reference thereto may be treated as non-existent. It will now stand as:—

RAPARNA ANTHRACIAS,

and is referable to the *Hypeninæ*.

XANTHORHŒ HYPOGRAMMA, n. sp.

Male, 24 mm. Head, palpi, antennæ, thorax, and abdomen ochreous, palpi, fuscous on sides and above on basal half, antennal pectinations (?). Abdomen with pairs of fuscous spots on each segment. Legs ochreous, anterior and middle pair banded with fuscous. Forewings elongate, triangular, termen rounded, faintly waved; pale ochreous, with fuscous markings; costa shortly strigulated from base to anterior edge of median band; a curved line from one-sixth costa to one-sixth innermargin; basal area fuscous-tinged; median band broad, anterior edge from one-third costa to one-third innermargin, gently curved inwards throughout, followed by two parallel lines; most distinct on margins; posterior edge from costa beyond two-thirds to innermargin beyond two-thirds, slightly angulated just below costa, and with a prominent median projection, somewhat sinuate above and below this, anteriorly edged throughout by a moderate, thick parallel shade, which is again edged anteriorly by a fine parallel line, leaving middle of band clear ground color; a well defined curved discal spot; a suffused spot on costa near apex; an irregular oblique streak from termen just below apex, continued as a short subterminal band to nearly half across wing, space between posterior edge of median band and termen marked with fine transverse pencillings of light fuscous; a series of dots along termen, arranged in pairs; cilia ochreous. Hindwings with termen faintly waved; pale ochreous; a well defined blackish discal dot; median fascia blackish, anterior edge suffused, posterior edge well defined, gently curved, somewhat prominent in middle; two or three obscure short parallel lines of fuscous above anal angle; dots along termen and cilia as in forewings. Underside of hindwings pale ochreous, markings of upperside reproduced, but much more distinct; discal dot connected with base by a black bar; parallel lines above anal angle forming a subterminal band.

The antennæ being imperfect render the position of this species uncertain; it is very unlike any other known to me.

Bairnsdale, Victoria; one specimen in February.

MONOCTENIADÆ.

TAXEOTIS DASYZONA, n. sp.

Female, 26 mm. Head, thorax, abdomen, and legs ochreous-grey. Face and palpi blackish ferruginous, palpi

sharply white on basal half beneath. Antennæ ochreous. Forewings elongate, triangular, termen faintly bowed, slightly sinuate beneath apex; 12 free; ochreous-grey, with fuscous markings; a small spot below costa at one-fourth, a second above innermargin at one-third, and a third midway between; a moderate, round, pale centred discal spot; a moderately thick fuscous shade from costa at three-fourths to innermargin at three-fourths, somewhat sinuate inwards on lower half; a row of dots along termen; cilia ochreous-fuscous. Hindwings with color, markings, and cilia as in forewings, but first three dots absent and fuscous shade nearly straight.

Nearest *anthracopa*, Meyr., but quite distinct by the neural character and markings.

Hoyleton, South Australia; one specimen in December.

Taxeotis holoscia, n. sp.

Female, 24 mm. Head, thorax, and abdomen dark fuscous, somewhat leaden-tinged. Antennæ fuscous. Face and palpi deep blackish fuscous, base not white beneath. Legs dark fuscous. Forewings elongate, triangular, termen gently rounded, faintly sinuate beneath apex; dark leaden-fuscous; 11 connected by bar with 12; an erect blackish mark on innermargin at one-third; a small spot on costa at one-fourth and another midway between, the three forming a somewhat curved series; a moderate fuscous discal spot; a row of somewhat connected small fuscous spots from costa at three-fourths to innermargin at two-thirds, gently curved outwards on upper half; a fine fuscous line along termen, more or less interrupted into spots; cilia fuscous, darker on basal half, with a distinct grey parting line. Hindwings dark fuscous, minutely irrorated with black; two short blackish lines from innermargin before and beyond middle, the latter better developed; line along termen and cilia as in forewings.

Not unlike some forms of female *intextata*, but the different position of lines as well as the wholly dark palpi at once separate it.

Brisbane, Queensland; one specimen in October.

Taxeotis xanthogramma, n. sp.

Male, 26 mm. Head and thorax greyish-ochreous. Abdomen silvery-grey. Face and palpi dark fuscous, palpi 1½, not white beneath. Antennæ deeply dentate, ciliations 1. Legs fuscous. Forewings elongate, triangular, termen gently rounded; 12 connected by bar with 11; grey, with fine scattered blackish scales; a double black dot on innermargin at

one-third, a second on costa at one-third and a third midway between, first and third, anteriorly edged with ferruginous; an indistinct blackish discal spot; a series of fine black spots from costa at two-thirds, to innermargin at two-thirds, strongly curved outwards in middle and edged posteriorly from below costa to termination by a moderate, bright ochreous-ferruginous line; a subterminal row of blackish spots, obscure; a row of well defined black dots along termen; cilia grey. Hindwings dull silvery-grey, without markings; dots along termen and cilia as in forewings. Underside of both wings silvery-grey, without markings.

Probably nearest *isophanes*, Meyr., but differs by the ochreous markings and absence of markings beneath. I have two specimens from Melbourne which only differ in being duller colored; from *phæopa*, Low., it differs especially by the fuscous palpi and face.

Broken Hill, New South Wales; one specimen in October.

DARANTASIA PERICHROA, n. sp.

Male, 26 mm. Head, thorax, and abdomen greyish-fuscous, head and thorax sometimes reddish-tinged. Antennæ fuscous, ochreous on basal one-third. Palpi and face dark fuscous, nearly black, basal half of palpi beneath sharply white. Legs fuscous. Forewings elongate, triangular, costa gently arched, termen obliquely rounded; greyish-fuscous, minutely sprinkled with fuscous; costa rather broadly reddish and sometimes strigulated with blackish; markings blackish, obscure; a small spot on innermargin beyond one-third, a second above in middle; a small discal spot; a dot on innermargin at three-fourths, and another on fold above; indications of a subterminal series of spots; a row of spots along termen; cilia greyish, mixed with fuscous. Hindwings pale silvery-grey; veins 6 and 7 sometimes from a point, separate, or stalked; a fuscous discal dot; dots along termen and cilia as in forewings.

The variation of veins 6 and 7 of hindwings is unusual. The species has considerable superficial resemblance to some species of *Tarsotis*, notably *isophanes*, Meyr., but the antennæ indicate its correct position with certainty. I possess what may possibly be the female of this species; it is much smaller (20. mm.), yet the markings are nearly identical, including the reddish tinge of thorax, head, and costa; and the termen of forewings is nearly straight.

Stawell, Victoria; three specimens in September.

NEARCHA OXYPTERA, n. sp.

Male, 40 mm. Head, thorax, and abdomen greyish ochreous minutely irrorated with blackish scales. Palpi 3, deep ferruginous, basal third whitish beneath. Antennæ ochreous. Anterior legs ochreous. (Middle and posterior pair broken.) Forewings elongate, triangular, termen bowed, gently waved, sinuate beneath apex, apex acute; vein 2 strongly curved and bent down so as to almost touch vein 1; dull ochreous, minutely irrorated throughout with fuscous; costal edge ochreous-ferruginous throughout; a black dot at base; indications of a curved series of black dots from one-third costa to one-third innermargin; a moderately large fuscous discal dot; a dull ferruginous shade, anteriorly edged by a series of obscure blackish spots, from costa at two-thirds to innermargin at two-thirds, gently curved outwards on upper half; an obscure transverse series of blackish subtriangular spots, more or less forming an interrupted shade; a row of black spots along termen; cilia ochreous-grey, becoming fuscous-tinged on basal half. Hindwings with termen hardly rounded, nearly straight, faintly waved; a moderate dark fuscous discal spot at one-third from base; ferruginous shade, subterminal markings, spots along termen and cilia as in forewings. Forewings beneath with a moderate tuft of curled hairs in cell; veins 2, 3, 4, and 5 somewhat raised and clothed with short hairs; spots along termen as above. Hindwings beneath with a large subcostal tuft of ochreous-grey hairs from base to one-fourth, becoming fuscous at posterior extremity, where they form a tuft; a large double patch of similar hairs in middle, and a ridge of ochreous hairs beneath, space between more or less hyaline; spots along termen as above.

Allied to *buffalaria*, Gn., but differs in shape of wing and especially by the tufts on underside of *forewings*. The curious formation of vein 2 and thickening on others mentioned are very noticeable points; it occurs in both forewings. It is highly probable that the posterior tibiæ will reveal additional peculiarities.

Illawarra, New South Wales; one specimen in November.

NEARCHA PYROSEMA, n. sp.

Male and female, 24-26 mm. Head and thorax pale greyish-ochreous, head more ochreous. Antennæ grey-whitish, pectinations blackish. Face and palpi ferruginous-blackish, palpi hardly 2, basal two-thirds beneath white. Abdomen pale greyish-ochreous, anterior segmental margins somewhat ochreous. Legs greyish-ochreous, posterior tibiæ dilated and

containing pencil of long black hairs. Forewings elongate, triangular, termen gently rounded, oblique; pale ochreous-grey, minutely irrorated throughout with blackish scales; a reddish spot on innermargin at one-third, with indications of one or two similar spots above; a moderately large black greyish-centred discal spot; a transverse series of light reddish-ferruginous spots from costa at three-fourths to innermargin at three-fourths, sometimes obsolete towards costa, most distinct on lower third and gently curved throughout; a pale fuscous parallel shade between spots and termen; a pale fuscous shade along termen; a row of black spots along termen; cilia greyish-ochreous. Hindwings with termen rounded; without tufts beneath; color, discal spots, and cilia as in forewings; other markings faintly indicated in female; strongly pronounced in male, but reddish markings become fuscous.

Probably between *ophla*, Swinh., and *anemodes*, Low.

Derby, Western Australia; two specimens, in November. Also from Tennant's Creek, Central South Australia.

DICHROMODES ORTHOZONA, n. sp.

Male and female, 24 mm. Head, palpi, and thorax fuscous, thickly irrorated with whitish scales, palpi in male 2, in female 2½, beneath dark ferruginous fuscous, basal half white. Antennæ fuscous, pectinations nearly 6. Abdomen fuscous, thickly irrorated with whitish scales, especially beneath, basal, segment narrowly white. Legs fuscous, thickly irrorated with whitish scales, tibiæ and tarsi more or less ringed with ochreous-white. Forewings elongate, triangular, termen rounded, faintly waved; fuscous mixed with dark fuscous and irrorated with white; basal third ferruginous-ochreous; an obscure short ferruginous mark at base; a moderately broad fuscous-whitish median band, edges evenly waved; edged anteriorly by a moderately thick nearly straight ochreous-white line, containing a fine ferruginous median line throughout, from costa at one-third to innermargin at one-third, gently curved inwards; posteriorly by a similar nearly straight ferruginous centred line, somewhat dilated on costa, from costa at about two-thirds to innermargin at two-thirds; a large somewhat quadrate black discal spot on median band above middle, resting on an obscure bar of whitish fuscous; a similar bar along fold; the discal spot is edged above and below by an obscure streak of dull ochreous; subterminal line whitish, waved, forming a moderate projection above, below, and in middle, last more prominent; edged anteriorly through-

out by a moderate, thick parallel fuscous shade, the posterior edge of which is parallel to limiting line of median band; a blackish line along termen; cilia whitish, mixed with fuscous and barred with blackish. Hindwings with termen rounded, hardly waved; fuscous; a faint darker discal dot; a darker curved postmedian line, followed by an obscure whitish parallel line; line along termen and cilia as in forewings.

Apparently nearest *compsotis*, Meyr., but apart from the longer antennal ciliations, it may be at once recognised by the almost straight limiting lines of median band, thus recalling *orthotis*. The palpi of male are distinctly shorter than female.

Roeburne, Western Australia; two specimens in November.

DICHROMODES ARISTADELPHA, n. sp.

Male, 26 mm. Head and palpi whitish-grey, palpi 2½, beneath white, ferruginous on sides and with a small snow white subapical spot on terminal joint. Antennæ fuscous, pectinations 2½. Abdomen ashy-grey-whitish, with obscure blackish marginal rings. Legs dark fuscous, irrorated with minute whitish scales, tibiæ and tarsi banded with ochreous. Forewings elongate, triangular, termen gently waved, rounded; ochreous, somewhat mixed with ferruginous-fuscous; a short black outwardly oblique line near base, hardly reaching innermargin; median band dark fuscous, well defined, limiting lines black; anterior edge from just beyond one-fourth of costa to about middle of innermargin, strongly curved inwards on upper two-thirds, and with a sharp angulation above innermargin; edged anteriorly throughout by a narrow parallel ochreous-white line, which line is anteriorly edged by a suffused fuscous line; posterior edge from about two-thirds costa to two-thirds innermargin, sinuate inwards above and below middle, causing median third to become prominently rounded; a narrow parallel ochreous-white line immediately following; a fuscous-whitish quadrate discal spot, edged on either side with a black line; a thick black bar connecting margin of band below middle; subterminal cloudy, silvery-grey, rather strongly sinuate inwards above and below middle, edged posteriorly by an irregular parallel ferruginous line; a sharply defined black spot resting on innermargin near anal angle, inclining to separate into 2 spots; a silvery-grey band along termen, anterior edge parallel to ferruginous line; a fine waved black line along termen; cilia grey-whitish, mixed with fuscous, terminal half grey, with fuscous bars, dividing line distinct. Hindwings with termen waved, rounded, dark

fuscous; a fuscous discal spot; a fine waved fuscous line from costa beyond middle to innermargin beyond middle, sharply indented in middle and becoming edged with whitish towards innermargin; a double black spot near anal angle; a narrow silvery-white mark below; line along termen as in forewings; cilia dark fuscous, terminal half grey, division distinct.

Very closely allied to *partitaria*, Walk., but differs by the totally different coloring and shape of first line besides other details. It is a prettily marked species.

Henley Beach, South Australia; one specimen in September.

HYPOGRAPHA CYANORRHŒA, n. sp.

Male, 24 mm. Head, palpi, and thorax bluish-white, fuscous tinged, face with a long bidentate projecting plate, projections acute, exposed, antennæ and legs fuscous. Forewings elongate, triangular, termen deeply waved on upper half, with a prominent projection in middle, sinuate inwards on lower half; fuscous; a very oblique moderately thick fuscous line from one-fourth innermargin to costa very near apex, wing between this and base fuscous, somewhat mixed with bluish-white, and with fine oblique fuscous parallel lines on costal portion; posterior area of wing beyond thick fuscous line bluish-white, gradually shading into fuscous to termen, and with fine waved fuscous anterior lines, parallel to first; a black line along termen; cilia bluish-white, fuscous at base. Hindwings with termen as in forewings, but median projection less pronounced; 6 and 7 stalked; bluishwhite; basal one-third tinged with fuscous, limited by a fainter darker line; a faint fuscous discal dot; a fine waved fuscous line, nearly straight, beyond middle, followed by a moderate parallel fuscous shade; a broader shade along termen; cilia fuscous, with some whitish scales at base.

Distinct from the other described species by the bidentate frontal projection, arrangement of lines and small size.

Alice Springs, Central South Australia; one specimen in November.

GEOMETRIDÆ.

XENOCHLÆNA, n. g.

Face somewhat rounded. Palpi moderate, porrect, with closely appressed scales, terminal joint short. Antennæ moderate, bipectinated to apex. Post tibiæ not dilated. Forewings with 6 out of 9 near base; 10 free, from base of 9; 11 rising separate, somewhat connected with 12 at costa. Hindwings 5 nearer 6 than 4; 6 and 7 stalked; 8 free, somewhat approximated to cell near base.

Type *porphyropis*, Lower. (P. L. S., N.S.W., 42, 1898.)

This genus is formed to receive the above. I formerly placed it in the genus *Arrhodia*, but it is properly referable to the *Geometridæ*.

The original specimen is still unique.

SELIDOSEMIDÆ.

SCIOGLYPTIS TRISYNEURA, n. sp.

Male, 26 mm. Head, palpi, thorax, and abdomen grey-whitish, thorax with moderate bifid posterior crest, face with obtuse horny projection. Palpi long, 2 densely haired beneath. Antennæ greyish, bipectinated pectinations 6 (apex broken). Legs greyish-fuscous, posterior pair whitish, posterior tibiæ dilated enclosing tuft of hairs. Forewings elongate, triangular, termen obliquely and gently rounded; 10, 11, and 12 free, nearly parallel; grey-whitish, obscurely irrorated with fuscous; fovea well developed, somewhat striated beneath; markings fuscous, very obscure, lines scarcely traceable; first dentate, from costa at one-fourth to innermargin at one-fourth, dot like on margins; median line nearly straight, followed by a parallel line, more oblique, somewhat beyond; a distinct discal dot; a very dentate oblique line from five-sixths costa to anal angle, emitting a streak from above middle to below apex; a row of dots along termen; cilia greyish. Hindwings with termen rounded; white on basal two-thirds, rest of wing light fuscous; a small fuscous discal spot; median shade faintly indicated, distinct on innermargin; an obscure waved subterminal line, distinct on innermargin; dots along termen and cilia as in forewings.

An obscure looking insect; the horny frontal prominence, crested thorax, neuration (which may vary) and dilated posterior tibiæ are, I hope, sufficient characters to recognise it. It is nearest *lithinopa*, Meyr. The antennæ are unfortunately damaged; the crested thorax, although not in accordance with the genus, are too trivial to separate the species generically, especially when the variations of neural characters of the genus are considered, consequently I prefer to place it here.

Arltunga, Central South Australia; one specimen in November.

PACHYTYLA, n. g.

Face somewhat rounded, with appressed scales, palpi moderate, porrected, thickly scaled, terminal joint very short. Antennæ in male bipectinated to apex. Thorax not crested. Abdomen with lateral crests. Femora glabrous, posterior

tibiæ strongly dilated, enclosing tuft of long hairs, posterior tarsi very short about half of tibiæ. Forewings with moderate fovea; 12 free, 10 and 11 stalked; 7 and 8 out of 9. Hindwings normal.

Probably nearest *Selidosema*, Hb., but the antennæ and legs are sufficient generic distinction.

Type *doliopa*, Low.

PACHYTYLA DOLIOPA, n. sp.

Male, 30 mm. Head, face, and antennæ dark fuscous, antennal pectional 3 at greatest length. Palpi ashy grey-whitish, fuscous above. Thorax, deep ferruginous-fuscous, collar broadly ashy-grey-whitish, division distinct. Abdomen strongly margined laterally, dark fuscous, with suffused whitish segmental bands. Legs ashy-grey-fuscous, posterior tibiæ strongly dilated containing pencil of long white hairs, tarsi very short, less than one-half of tibiæ. Forewings elongate, triangular, termen gently and evenly waved, dark cinereous-fuscous, obscurely mixed with ferruginous; fovea moderate; markings black, well defined; a fine inwardly oblique line close to base; a fine, somewhat waved line from one-third costa to one-third innermargin, slightly indented above middle; a similar line from near middle of costa to middle innermargin; a third similar line, less waved, from two-thirds costa to two-thirds innermargin; a strongly dentate line from three-fourths costa to innermargin before anal angle, edged anteriorly by a moderate shade of ferruginous throughout, dentations tending to be carried along veins, especially above and below middle; an inwardly oblique streak from just below apex; a waved line along termen; cilia ashy-grey-fuscous, with blackish bars at extremities of veins. Hindwings with termen waved; white tinged with fuscous; lines of forewings, except basal more or less indicated; a moderate fuscous band along termen, becoming narrowed towards anal angle; cilia white, barred with fuscous.

Very similar in general appearance to a small specimen of *Stibaroma melanotoxa*, Meyr.

Broken Hill, New South Wales; one specimen in June. I have seen a specimen from Brisbane, Queensland.

ANGELIA, n. g.

Face with horny projecting plate. Palpi moderate, porrected, rough scaled, terminal joint rather short. Antennæ in male bipectinated to apex. Thorax somewhat crested, rather hairy beneath. Femora glabrous, or slightly hairy.

Posterior tibiæ more or less dilated. Forewings in male with well developed fovea; 10 connected on anastomosing with 12 and 9, 11 rising out of 10 between connections. Hindwings normal.

Type *tephrochroa*, Low.

Allied to *Amelora*, Meyr., on the one hand, and *Chlenias*, Gn., on the other; differing from the former by the horny projecting plate of face and well marked fovea of forewings; which latter character also separates it from *Chlenias*.

I have dedicated the genus to my friends, Messrs. S. and F. Angel, in recognition of their enthusiastic work and continued kindness.

ANGELIA TEPHROCHROA, n. sp.

Male, 38 mm. Head dull ochreous-whitish, face with moderate horny projection, rounded truncate. Palpi and antennæ fuscous, antennal pectinations at greatest length 6. Thorax light slaty-grey, finely irrorated with blackish. Abdomen and legs pale slaty grey. Forewings pale slaty-grey, finely irrorated throughout with blackish scales; fovea well developed, costal edge sometimes edged throughout narrowly with orange fuscous; a reddish-ferruginous line of about 5 dots, interrupted, from costa at one-third to innermargin at one-fourth; a similar colored dentate line from four-fifths costa to innermargin before anal angle, both lines sometimes absent; a large somewhat quadrate black discal spot; cilia greyish-ochreous. Hindwings ochreous-grey, finely irrorated with fuscous, except basal third; a moderate fuscous discal spot; cilia as in forewings.

Probably nearest *platydesma*, Lower.

Broken Hill, New South Wales; two specimens in May.

ANGELIA PLATYDESMA, Lower.

(*Amelora platydesma*, Lower. T.R.S., S.A., 1901, 65.)

ANGELIA HETEROPA, Lower.

(*Amelora heteropa*, Lower. T.R.S., S.A., 1901, 64.)

I refer the two above species to this genus; the fovea is well developed in both.

ANGELIA CALLISARCA, n. sp.

Male, 30 mm. Head and thorax fleshy-carmine, face with a prominent tridentate plate, median projection long, tolerably acute, thorax beneath tinged with fleshy carmine. Antennæ fuscous, pectinations at greatest length 6. Abdomen ochreous-grey. Palpi fuscous-grey. Legs fuscous, pos-

terior pair greyish-ochreous. Forewings elongate, triangular, costa gently arched, termen oblique, hardly bowed; bright fleshy carmine, with deep fuscous-carmine markings; fovea moderate; a narrow transverse fascia, from one-fourth costa to one-fourth innermargin, upper half outwardly oblique, thence strongly curved inwards below; a large discal spot; a moderate, slightly oblique, thick, strongly dentate line, posteriorly edged with obscure ochreous, from costa at about four-fifths to innermargin at three-fourths, gently curved inwards on lower half; an obscure line along termen; cilia fleshy-carmine. Hindwings with termen rounded; 6 and 7 from a point; fuscous-whitish, paler on basal half; discal dot and second line fuscous, marked as in forewings; cilia fleshy-carmine.

Allied to *heteropa*, but apart from the longer antennal pectinations, it is immediately recognisable by the curious tridentate horny plate of forehead, which in *heteropa* is broadly truncate.

Broken Hill, New South Wales; one specimen in April.

Paramelora, n. g.

Face nearly flat, hardly prominent. Palpi moderate, porrected, rough scaled, terminal joint very short. Antennæ in male bipectinated nearly to apex, last four apical joints dentate. Thorax slightly hairy beneath. Posterior tibiæ hardly dilated. Forewings in male with small fovea; 10 connected with 12 and 9; 11 absent (rarely present (?)); 12 sometimes free. Hindwings normal.

This genus is allied to the preceding, but differs by the flat face, neuration, &c. In one forewing of a female 11 runs out of 12 from just beneath costa, in the other wing of the same specimen it is absent, so that I consider it an accidental deformity occurring in the individual in question, as the other species have the neuration as mentioned, but vein 12 sometimes hardly touches 9.

Type *zophodesma*, Low.

Paramelora zophodesma, n. sp.

Male, 20-24 mm. Head and thorax cinereous-grey. Palpi whitish, fuscous beneath. Antennæ fuscous, pectinations at greatest length 6. Legs fuscous-grey. Abdomen greyish. Forewings elongate, triangular, termen gently rounded, oblique; fovea moderate; dull white, suffusedly mixed with blackish, and finely irrorated with fuscous, so as to appear ashy-grey-whitish; a moderate thick black streak from costa

at one-fourth to innermargin at one-third, angulated beneath costa, thence almost straight, edged anteriorly by its own width, with a moderately clear white space, sometimes absent; a moderately thick black streak from costa before three-fourths to innermargin at two-thirds angulated outwards in middle and edged as in first streak; ground-color between first and second black lines much darker, and with strong indications of a similar angulated streak in middle, in one specimen well developed; a thick blackish, nearly straight suffused subterminal band, posterior edge irregular, anterior parallel to edge of second whitish streak; a row of black dots along termen; cilia cinereous-fuscous. Hindwings with termen rounded: greyish, finely strigulated throughout with fuscous, more dense beyond middle; two or three obscure whitish teeth on innermargin towards anal angle; cilia as in forewings. Costa of forewings beneath ochreous.

Broken Hill, New South Wales; two specimens in October and May.

PARAMELORA LYCHNOTA, Lower.

(*Xanthorrhæ lychnota*, Lower. P.L.S., N.S.W., 1900, 404.)

I refer this species to this genus; fovea well defined.

RHYNCHOPSOTA, n. g.

Face with appressed scales. Palpi very long, with appressed scales, terminal joint concealed. Antennæ of male bipectinated to apex. Thorax smooth. Posterior tibiæ moderately dilated. Forewings without fovea; 7 and 8 out of 9, 10 out of 9; 11 connected with 9 at a point; 12 free; without fovea. Hindwings 5 absent, 6 and 7 separate; 8 closely approximated to cell in middle with a long pencil of hairs lying at base beneath.

A peculiar genus, not very near any other in the group, the long palpi and hairs on hindwings beneath are rather unusual characters. The single species bears considerable superficial resemblance to *Crunophila ramostriella*, Walk. (*Pyralidina*).

Type *delogramma*, Low.

RHYNCHOPSOTA DELOGRAMMA, n. sp.

Male, 34 mm. Head and palpi white, palpi ochreous fuscous on sides. Thorax white, palagia and a longitudinal median streak fuscous-ochreous. Antennæ fuscous, pectinations 6 at greatest length. Abdomen whitish. Legs whitish. Forewings elongate, triangular, termen moderately rounded, oblique; ochreous-fuscous, with well defined whitish markings; ochreous-fuscous, with well-defined whitish markings;

a broad streak immediately beneath costa, attenuated posteriorly; a similar streak beneath first, only separated by a fine line of ground color, from one-third to termen, finely attenuated anteriorly, broadly dilated posteriorly and continued as fine streaks along veins to termen; a broad longitudinal streak in middle, becoming trifurcate posteriorly, first furcation emitted from lower edge in middle and continued along fold to termen; second similar at two-thirds; third on upper edge, both to termen; a fine line above innermargin throughout, connected at base with median streak; cilia fuscous, with whitish streaks at extremities of veins. Hindwings with termen faintly sinuate in middle; pale ochreous-whitish; a fuscous band along upper half of termen, more pronounced beneath; a moderately long pencil of ochreous hairs beneath, rising at base; cilia ochreous-whitish.

Hobart, Tasmania; one specimen in November.

GASTRINOPA, n. g.

Face rounded, somewhat prominent. Palpi moderate, densely scaled, terminal joint short. Antennæ of male bipectinated nearly to apex, apex simple. Thorax without crests (?), densely hairy beneath. Abdomen smooth. Femora glabrous, posterior tibiæ of male strongly dilated, containing pencil of hairs. Forewings without fovea; 12 free; 10 and 11 rising separate, thence anastomising on median third, thence separating; 10 slightly connected with 9. Hindwings normal.

Differs from *Gastrina*, Gn., to which the species has remarkable superficial resemblance by the neuration and abdomen. The thorax is somewhat denuded, consequently I am unable to decide if the crest is present or not.

Type *xylistis*, Low.

GASTRINOPA XYLISTIS, n. sp.

Male and female, 36-38 mm. Head, palpi, antennæ, thorax, and abdomen dark ferruginous-fuscous. Antennal pectinations of male about 2½. Legs grey-whitish, thickly irrorated with ferruginous-fuscous. Forewings elongate, triangular, termen waved, rounded; ferruginous-fuscous, finely strigulated with transverse blackish markings; markings black; a gently curved line from one-third costa to one-third innermargin, faintly angulated above innermargin; a gently waved line from costa before three-fourths to innermargin at two-thirds, moderately curved inwards on lower half; ground color between first and second lines more blackish; an indistinct

discal dot followed by a patch of pale ochreous, anterior to second line; a fine waved line along termen; cilia fuscous. Hindwings with termen strongly waved; dull whitish finely strigulated with fuscous; especially on innermargin; a fuscous dot; a broad ferruginous-fuscous band along termen finely strigulated with blackish, paler on upper edge; line along termen as in forewings; cilia greyish, with a fuscous line.

Blackwood, South Australia; two specimens in October.

Amphicrossa hemadelpha, Lower.

I have recently obtained a single female specimen of this species. It only differs from the opposite sex as follows:—Antennæ dentate, strongly ciliated; hindwings more fuscous. The ciliated antennæ is a curious character shared by many species of *Chlenias*, Gn., and is a useful guide in recognising the different species. The insect formerly doubtfully described as the female of *hemadelpha*, is unquestionably the female of *Chlenias serina*, Lower, which, although very similar, and indeed could easily be mistaken for it, is immediately separated by the simple antennæ.

Broken Hill, New South Wales; one specimen in April.

TINEINA.

XYLORYCTIDÆ.

Cryptophaga melanoscia, n. sp.

Male and female, 40-50 mm. Head, palpi, thorax, and legs ashy-grey-whitish antennæ white, pectinations 5, orange yellow. Abdomen greyish, segmental margins dull orange; second broadly dull orange. Forewings elongate, moderate, costa in male nearly straight, in female arched, termen obliquely rounded; 2 from about two-thirds, 11 from middle, ashy-grey-whitish, finely irrorated throughout with short black scales; markings black; a short streak from costa near base to lower margin of cell, angulated in middle; a short thick mark in cell at one-third; a second, similar at end of cell; lower margin of cell outlined in black; from first mark proceeds a fine line to two-thirds of costa; veins towards termen more or less outlined with black, becoming very pronounced in middle of veins 5 and 6; 5 or 6 dull whitish spots, between middle of costa and apex, separated by dull fuscous marks: cilia ashy-grey-whitish chequered with black. Hindwings with termen rounded, in male somewhat sinuate before anal angle; greyish-fuscous, becoming lighter on basal half; cilia greyish.

Intermediate in form between *irrorata*, Lew., and *leucadelpha*, Meyr., differing especially from the former by the hindwings and from both by the well defined blackish markings of forewings.

Birchip, Victoria; two specimens received from Mr. D. Goudie, who bred the species from *Casuarina, sp.*, in October.

CRYPTOPHAGA DIPLOSEMA, n. sp.

Male and female, 40-50 mm. Head, thorax, and palpi fleshy white, thorax on posterior two-thirds reddish-ochreous. Antennæ white, pectinations 4, ochreous. Legs fleshy red, hairs of posterior pair orange. Abdomen orange, beneath fleshy red. Forewings elongate, moderate, costa arched, rather strongly in female, termen obliquely rounded, 2 from three-fourths, 3, 4, and 5 closely approximated at base; 4 and 5 stalked in male; reddish-ochreous, much paler in male; costa moderately pale fleshy white, from base to two-thirds, broadest on basal portion; a deep red somewhat quadrate patch on innermargin at one-sixth, reaching half across wing; a similar patch at about middle; a thick, deep red streak from upper edge of first spot, longitudinally continued to beyond second spot; markings very obscure in female; cilia deep reddish. Hindwings and cilia orange.

This insect has stood in my collection for some years as *phæthontia*, Meyr., but, having received a male from Mr. Dodd, of Townsville, Queensland, I consider it distinct from that species. It differs by the orange abdomen and hindwings, besides the other details. It has considerable resemblance to *rubescens*, Lew., but the strongly arched costa, rounded termen, and shorter antennal pectinations are sufficient to distinguish it from that species.

Duaringa, female; Townsville, male (*Dodd*), Queensland, in November and December two specimens.

PROCOMETIS TETRASPORA, n. sp.

Male and female, 24 mm. Head, palpi, antennæ, and thorax ashy-grey-whitish, second joint of palpi fuscous externally except apex. Legs ashy-grey-whitish, anterior and middle tibiæ and tarsi dark fuscous, ringed with whitish. Abdomen dull reddish ochreous, with silvery-grey segmental margins. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 to apex or immediately above; ashy-grey-whitish; costal edge narrowly whitish on posterior half, and streaked with fine inwardly oblique fuscous marks; a fine white streak along fold from base to anal angle, less defined in male; a fuscous spot in disc at one-third; a second

obliquely below and beyond; and a third at posterior end of cell, connected with first by a white streak; indications of a fourth below third; cilia cinereous-grey, terminal half grey. Hindwings light fuscous; 3 and 4 from a point; 6 and 7 from a point, hardly short stalked; cilia whitish grey in female, darker in male, both sexes with fuscous subbasal line.

Not very near any other described species, but probably nearest *monocalama*, Meyr. It has a striking resemblance to *Hypertricha ephelota*, Meyr., but the palpi and presence of vein 8 of forewings are distinct.

Melbourne, Victoria; two specimens in March.

Procometis periscia, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, and legs ashy-grey-whitish, palpi infuscated on second joint externally, thorax with 2 or 3 obscure whitish longitudinal streaks, patagia whitish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 to slightly above apex; dark fuscous, more or less minutely irrorated with fine whitish scales; a fine white line along fold, from base to anal angle; a fine white line in middle of wing, from near base to near base to near three-fourths, attenuated anteriorly and edged above with a fine black line; veins towards termen more or less outlined with blackish; cilia ashy-grey-fuscous. Hindwings with veins 3 and 4 from a point; 6 and 7 short stalked; rather dark fuscous; cilia greyish with a fuscous basal line.

Melbourne, Victoria; one specimen in March.

Macrozygona, n. g.

Head smooth, antennæ moderate, in male filiform, simple, basal joint moderate, without pecten. Labial palpi long, curved, ascending, terminal joint nearly as long as second. Thorax smooth, abdomen moderate. Posterior tibiæ rough haired above. Forewings with vein 2 from four-fifths, 3 from angle, 7 absent, coincident with 8. Hindwings with hairs of costa moderately developed beneath; 3 and 4 very short stalked; 6 and 7 stalked.

A connecting link between *Phylomyctis* and *Hypertricha*, but most allied to the former, from which it differs by the palpi of male, and stalking of veins 6 and 7 of forewings.

Macrozygona microtoma, n. sp.

Male, 16 mm. Head whitish, face white. Palpi, antennæ, and thorax ochreous fuscous, palpi white on lower two-thirds of second joint externally. Antennæ whitish on basal one-third. Legs white, fuscous above. Abdomen greyish-

ochreous, white beneath. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; ochreous-fuscous; a white costal streak from near base to three-fourths, attenuated at extremities; a rather broad irregular white streak along fold, becoming somewhat blotch-like at posterior extremity and continued to anal angle, where it is constricted; a suffused whitish spot at apex; cilia ochreous fuscous. Hindwings light ochreous-fuscous, somewhat shining; cilia grey, with fuscous parting line.

Melbourne, Victoria; one specimen in March.

HYPERTRICHA EPHELOTA, Meyr.

I have received females of this species, which measure 40 mm. in expanse. It differs very little from the male as regards markings and color, excepting that the whitish streak of forewings is less defined; in fact, all the markings of the forewings are suffused through the blackish coloring. The hindwings beneath are without any costal hairs (in the male they are well developed), and veins 3 and 4 of the hindwings are connate or nearly separate at origin in two specimens; and in one specimen actually stalked, so that in determining the genus this peculiar irregularity should not be lost sight of. The terminal joint of the palpi is similar to male—that is, one-fourth of second joint.

AN ANALYSIS OF THE ASH OF THE ACACIA SALICINA.

BY A. J. HIGGIN.

[Read August 4, 1903.]

Some time ago Professor Stirling suggested that it would be of interest if an analysis of the ash of the *Acacia salicina* were made with a view of ascertaining whether it exhibited any material difference from the ashes of other plants.

The ash of the *Acacia salicina* is used by the natives of Australia for mixing with pituri before mastication. An account of the preparation and use of this substance has been kindly supplied to me by Professor Stirling.

Pituri consists of the dried leaves and twigs of *Dubosia Hopwoodi*, natural order, Solinaceæ.

It is the masticatory or chewing substance extensively used for the sake of its stimulant and narcotic properties by the natives of a large tract of Eastern Central Australia, extending northwards from Cooper's Creek and including parts of South Australia, New South Wales, and Queensland. The leaves and twigs are gathered about August, when the plant is in flower. These are sweated beneath a layer of fine sand, dried, roughly powdered, and then packed in netted bags or skins for transport, in which form it serves as an important article of barter with neighboring tribes. Before use the pituri is damped, mixed with the ashes of the leaves and twigs of certain shrubs, usually those of the *Acacia salicina* (certainly in the district from which the specimen used for analysis came, and probably in others), and rolled up into a "plug." This is chewed, the saliva swallowed, and if the natives are in company, the plug is handed from one to another.

Pituri is also employed in Central Australia for poisoning emus, even in parts where it is not used for mastication. For this purpose a bundle of the twigs is placed in a small waterhole. On drinking the water the birds become stupefied, when they are easily killed.

The pituri plant is restricted to Australia, and is of scattered occurrence throughout the dry zone, mainly between S. lat. 27 and 21. The wood ash is probably mixed with the pituri for the purpose of slowly liberating the alkoloid (piturine, $C_{12}H_{16}N_2$) contained in it during the process of mastication. This is brought about by the alkali contained in the ash; in this case caustic lime.

A paper dealing with the preparation and properties of piturine was published some years ago by Professor Liversidge, "The Alkaloid from Piturie."* It is a liquid strongly resembling nicotine in properties.

Its physiological action is discussed by J. N. Langley, F.R.S., and W. Lee Dickenson, M.B., M.R.C.P., of Cambridge, in a paper entitled "Pituri and Nicotine."† In this paper the authors state that "The main results of our experiments, as far as the action of pituri is concerned, can be given in a few words. The physiological action is identical with that of nicotine."

The material handed to me for analysis by Professor Stirling consisted of several small branches with the leaves attached. The locality from which it was obtained is the Warburton River, near the north-east corner of Lake Eyre, and it was determined by the late Professor Tate to be the *Acacia salicina*. A quantity of the leaves was burnt in a platinum dish, and heated till all organic matter was destroyed. The ash was strongly alkaline to litmus paper, and was almost completely soluble in hydrochloric acid with evolution of a little carbon dioxide gas.

The results of the analysis were as follows:

Silica	SiO_2 ...	1.86%
Lime	CaO ...	40.70
Magnesia	MgO ...	3.18
Ferric oxide	Fe_2O_3 ...	.27
Potash	K_2O ...	3.41
Soda	Na_2O ...	1.01
Sulphuric anhydride ...	SO_3 ...	30.09
Phosphoric anhydride ...	P_2O_5 ...	1.94
Chlorine	... ...	5.54
Carbon dioxide moisture ...	... ...	12.00
		100.00

These results may be a little low as regards the potash and soda, because no special precautions were taken to prevent loss of these substances by volatilization. The temperature at which the leaves were burned was not, however, high.

It will be seen from the analysis that this ash contains a very high percentage of lime and sulphuric anhydride. The latter, calculated as calcium sulphate, shows 51.15 per cent. of that substance. This leaves 21.06 per cent. of lime present as CaO and $CaCO_3$. As already mentioned, there was only

* Proceedings of the Royal Society of New South Wales, vol. xiv., p. 123.

† Journal of Physiology, vol. xi., p. 265.

a small amount of carbon dioxide gas evolved on dissolving the ash in hydrochloric acid, so that the lime not present as calcium sulphate would be present chiefly as calcium oxide, CaO. It is this substance which liberates the piturine during mastication.

The presence of such a high percentage of calcium sulphate seemed to me to be remarkable and it was thought that a comparison of this ash with some others obtained from Australian bushes would prove interesting. Professor Rennie kindly pointed out to me that some years ago Mr. W. A. Dixon, of Sydney, had made some analyses of the ash of various Australian bushes. His results were published in the Proceedings of the Royal Society of New South Wales, vol. xiv. I referred to this paper, and found that in no case does any analysis, out of the eight given, show the presence of more than 4.5 of sulphuric anhydride, and that the lime present is very much less than in the ash of the *Acacia salicina*.

I give two of the determinations of sulphuric anhydride and lime made by Mr. Dixon:

	(1) Dwarf Saltbush (*Atriplex sp.*).		(2) Cotton Bush (*Chenolea bicornis*).	
Lime	CaO	17.74%	CaO	24.33%
Sulphuric anhydride	SO_3	4.43	SO_3	3.95

An analysis of the ash of the *Alstonia constricta*, "Fever bark," published by Mr. Maiden, shows a higher percentage of lime and sulphuric anhydride than the above, viz.:

Lime	CaO ...	32.83%
Sulphuric anhydride ...	SO_3 ...	9.33

It will be seen that none of these ashes contain nearly so much lime and sulphuric anhydride as the ash of the *Acacia salicina*.

There does not appear to be much published matter with regard to the ashes of plants, &c., and it is impossible, therefore, to make an extensive comparison of this ash with others. Phillips and Bauerman, in their work on Metallurgy, give a few analyses of the ash of some European woods, and I find from these that the percentage of calcium sulphate present is less than it is in the ashes of the Australian woods already mentioned.

The results given below are calculated as calcium sulphate:

1. Beech, from Switzerland ...	2.3% ...	$CaSO_4$
2. Scotch Fir, from Giessen ...	3·31 ...	$CaSO_4$
3. Scotch Fir, from Giessen ...	5.05 ...	$CaSO_4$

It seems to me that there is little doubt that the calcium sulphate is present in the ash of the *Acacia salicina* in much larger quantity than in any other ash at present known to us.

NOTES ON SUPPOSED VOLCANIC DUST FROM THE NORTHERN TERRITORY.

BY PROFESSOR RENNIE, M.A., D.Sc., AND A. J. HIGGIN, F.I.C.

[Read August 4, 1903.]

The following is a portion of a letter received by us from Sir Charles Todd in December, 1902:

"I have just received the enclosed telegram from Mr. Christie, lighthouse keeper at Point Charles, who has collected some of the supposed volcanic dust which has been resting on Northern Australia for some weeks past, and is supposed to have come from Martinique."

The telegram referred to in the above extract is as follows:

"Profiting by the experiments made by Mr. Bleeser in catching volcanic dust, it occurred to me that the lighthouse windows would be an ideal catchment, and I had noticed before I left that they were becoming dusty. On arrival here, however, I found that 115 points of rain had fallen, which, of course, eliminated all signs of dust, washed the glass clean, and effectually laid any local dust. This was Saturday, November 22nd. Noted on the 23rd that smoke with the same peculiar smell was about, but not so thick; 24th still smoky. Tried window panes, and could detect a little dust on white rag. 25th still smoky. Thinking rain would probably fall, decided to do as follows: Took 4 gallons water, jug, washbasin, and empty bucket. Placed washbasin under window ledge, and with jug poured water on the top pane. This ran down the three panes 10 ft., and was caught in the basin and transferred to bucket, and so on. I thus washed over 300 superficial feet of glass with running water only; the result a bucket of dirty water. This was covered, and stood to settle for two days; the water syphoned off. The bottom half a pint placed in a glass tumbler, and settled for one day; the remainder of water syphoned, and the tumbler stood near the fire till contents evaporated to dryness. The residue, only a few grains, I am sending to you. It looks very like volcanic ash. I may mention that during this period of dust or smoke catching the wind was from north-west and north-east, and once only for a short time east. The lighthouse windows are 120 ft. above sea level, and all these winds blow directly off the sea. The nearest land north-west would be Bathurst Islands,

45 miles; north, Melville, 35 miles; north-east, nearest land 25 miles; east, nearest land 14 miles. Further, 115 points of rain having fallen, the ground was well saturated, and there is no traffic, nor are there any roads here to create local dust; hence this must be purely atmospheric, wherever it comes from. In looking at the dust with a small magnifier some small white specks can be seen. These probably are pieces of paint (white zinc) washed off the astragals of the windows in the downward flow of water."

Sir Charles Todd kindly forwarded the sample of dust, referred to, to us for examination. An examination with a magnifying glass at once showed that the sample consisted largely of organic fibres of some kind, with the specks of white paint referred to by Mr. Christie. The whole weighed only 0.2948 gramme. The residue after ignition weighed 0.201 gramme, and of this 0.009 consisted of oxide of lead. The small quantity of the sample, combined with the presence of so much impurity, rendered any attempt at a complete chemical analysis useless. An estimation of silica, however, gave 63.06 per cent., after estimating and allowing for the oxide of lead present in the ignited residue. This is somewhere about what might be expected from a volcanic dust. An account of a thorough microscopic examination, which confirms the theory of the volcanic origin of this dust, will be found in a separate note by Mr. Woolnough.

Microscopic Examination of Supposed Volcanic Dust from the Northern Territory.

By W. G. Woolnough, B.Sc., F.G.S.

[Read August 4, 1903.]

The material is very fine in grain, so that microscopic examination is difficult. It is of such a heterogeneous character that detailed description is almost impossible. The most abundant determinable constituents are long organic fibres with relatively bright polansation colors. Next in abundance come spicules of various shapes—anchor-shaped, dumb-bell-shaped, and so on. These consist of silica, and are quite isotropic. They are derived, probably, from holothurians and sponges. Fragments of foraminifera (Globigerina ?) can be detected. Each chamber gives the characteristic cross between crossed nicols. The truly volcanic material is subordinate to the other constituents.

Felspar in perfectly glassy granules are moderately plentiful. It shows no trace of twinning, so far as I have been able to determine. Some sections are bounded by cleavages more or less marked. The refractive index is in all cases higher than that of xylol balsam.

Magnetite is fairly considerable in amount, and includes some of the largest fragments. It is somewhat remarkable that this, the mineral of highest specific gravity, should be present in such comparatively large fragments.

Much dark brown glass is observable. It is filled with minute hair-like microlites, which are faintly doubly refracting. There is a small amount of pyroxene. Whether this is rhombic or monoclinic I cannot determine, as the fragments are very minute. A faint greenish-yellow color can be detected, and the double refraction is noticeably of a higher order than felspar.

An occasional piece of hornblende or biotite completes the list.

It has been suggested that this dust has been derived from the great West Indian eruptions of 1902. I am inclined to think that we must seek a nearer source for it. The abundance of magnetite has already been commented on. I think it improbable that such, comparatively, large fragments of this mineral, which possesses a specific gravity of 5.17, could drift half round the earth.

the others near the base. In the young example just mentioned the junction of the higher orders with the principal is nearer the calice, and from a third to two-thirds from its margin. The wall is slender, and the costæ, like the septa, extend outwards from it.

The dimensions of the type, which is evidently an adult example, are:—Height of corallum, 9 mm.; length of calice, 10 mm.; breadth of calice, 9 mm. The calice figured is 7 mm. long and 6 mm. broad. Its corallum is well preserved, and is 6.5 mm. high.

Locality, &c.—In Eocene strata at Brown's Creek. Two whole examples, and a portion of a third have only been found.

Trochocyathus planicostatus, *spec. nov.* Pl. i., figs. 3*a*, *b*.

The corallum is longer than broad and pyramidal shaped with a sharply pointed base. The calice is subplane and elliptical, the major and minor axes being in the ratio of 100 to 70.

The septa are exsert and in six systems with three cycles. They are spined on the lateral edges, while lower down there are small granules. All are short, but the primaries are longer than the secondaries, and these again than the tertiaries. The two first orders are stout and subequal, and the tertiaries slender.

The axial space is large, and in the centre there is a fascicular columella having three longitudinally arranged lobes on its surface. Well marked, spined pali are placed in two crowns before the primary and secondary septa, and are connected with these and also with the columella by short, stout, sunken processes.

The costæ in this coral form its most remarkable feature. They are of two kinds; first, 24 prominent, equal, flat, and almost plain costæ, very broad but rounded off at the top, and then regularly diminishing to the pointed base. They reach to the margin of the wall only, and are quite distinct from the septa, the exsert portions of which present the appearance of being inserted in each interspace. The second series of costæ, also 24 in number, are continuations of the three orders of septa, but below the exsert portions of these, that is, from the margin downwards, they are represented on the wall by extremely thin, granular, and sunken lines, which can usually be traced almost to the base. In a young fresh looking specimen in my collection, the contrast between the plain, prominent costæ, terminating at the margin of the wall, and the adjacent spined, exsert septa rising much above it is very striking. The example selected as type is much larger, but, though in good condition, it is not quite as well preserved.

The same young individual has the pali and other features of the calice most clearly marked.

The dimensions of the type are:—Height of corallum, 7 mm.; length of calice, 7 mm.; breadth of calice, 5 mm.

Locality, &c.—Tolerably abundant in the Eocene of the Adelaide bore. Collected by Professor Tate.

T. heterocostatus, T. Woods, from Aldinga, and also occurring in the Adelaide bore, has a similar alternation of broad and slender costæ, the latter of which correspond to the septa, while the former are in the interspaces. In his description of this species, Woods considers that the broad costæ are continued by septa of the fourth and fifth orders, which slightly project into the fossa as a thin edge,* but an examination of several specimens leads me to read the calice differently. One of these specimens enables me also to state that the columella, the structure of which Woods could not determine, is fascicular. *T. heterocostatus* is closely allied to *T. planicostatus*, but differs in shape, as well as in other respects.

Trochocyathus Adelaidensis, *spec. nov.* Pl. i., figs. 4*a*, *b*.

The corallum is free, short, and compressed, especially inferiorly. The base is slightly concave, and equals or even exceeds the calice in length. The lateral edges are doubly curved, being concave just below the calice, and then convex to the basal extremities. The calice is shallow and elliptical with its axes in the ratio of 100 to 76.

The septa are exsert and in six systems with four cycles. The primaries and secondaries are subequal and larger than the tertiaries; the quaternaries are short thin lamellæ. The tertiaries bend towards and join the secondaries; the quaternaries also sometimes unite with the enclosed tertiary. All are beset with pointed granules on their sides.

The central fossa is large and the columella is apparently fascicular. Only three specimens of this coral have been found, and the calices of all are much worn. One of them has been rubbed down to a level surface, which thus represents a transverse section of the calice a little below its summit (pl. I., fig. 4*b*). The details of the calice given in the text have been worked out from an examination of all three examples. The pali are indistinct, but I judge them to be moderately thin structures and placed before the primary and secondary septa.

Exteriorly the corals are better preserved, and the structure of the costæ can be easily read. They correspond to the septa, and consist of rows of small, transversely elongated granules.

* On some Fossil Corals from Aldinga. Phil. Soc., Adelaide, vol. I, 1877, pp. 109, 110, pl. ii., fig. 1.

They are prominent, equal, and extend to the base. Those at the edges follow the outline of the corallum, and are thus doubly curved, while the more central ones become nearly but not quite straight.

The corallum is from 5 mm. to 7mm. in height, and the calice from 5 mm. to 6.5 mm. long by 4 mm to 5 mm. broad. In the largest example the base is 5 mm. longer than the calice.

Locality, &c.—Like the preceding species, from the Adelaide bore. Collected by Professor Tate.

Placotrochus Pueblensis, *spec. nov.* Pl. ii., figs. 1*a*, *b*.

The corallum is moderately tall, curved, and tapers to a rounded and almost pointed base. There is a slight constriction about two-thirds from the summit, below which a faint ridge marks the concave surface of the curve. The calice is almost but not quite circular, and throughout its length transverse sections of the corallum are approximately circular.

The septa are exsert, slender, and in six systems, with four complete cycles. The primaries and secondaries are equal, and the remaining orders become gradually thinner as well as shorter; all are sparingly granular.

The axial fossa is deep centrally, and is traversed longitudinally by a prominent columella, which, instead of being a single lamella, as in Placotrochi generally, is double, with one division rather shorter than the other. This character is certainly not due to fission since the lens shows delicate granules on the inner side of each lamina. Probably the division does not extend very far down, and I should not be surprised to find examples with the columella single. There is also a short, thin, buttress-like process from the longer limb of the columella and in a line with a secondary septum.

Costæ corresponding to the principal septa are visible on the wall as thin, slightly raised ridges. The wall is thin and covered by a delicate shining epitheca ornamented by several inconspicuous transverse folds which, near the calice, form arched crests upon the costæ.

Height of corallum, 17 mm.; the diameters of the scarcely elliptical calice are respectively 10.5 mm. and 10 mm.

Locality, &c.—I collected the unique example of this species on "The Ledge" at Spring Creek in 1899, and though the whole section has been since searched over and over again no other has been seen. Fortunately the specimen is exceptionally well preserved.

P. Pueblensis may be compared with *P. corniculatus*, mihi, from the Adelaide bore, but the latter is compressed inferiorly, and has a more elliptical calice.

Placotrochus inflectus, *spec. nov.* Pl. ii., figs. 2*a*, *b*, *c*.

The corallum is slightly curved, and tapers regularly to a small flatly pointed base. It is compressed, and its lateral edges are ridged by projecting costæ. The wall is moderately stout, and is covered by a strong epitheca having transverse chevron markings. The calice is elliptical with its axes in the ratio of 100 to 87.

There are six systems of septa with four cycles, but the fourth cycle is only developed in the end systems, each of which occupies a larger space in the calice than a central one. The first and second orders are stout and equal, but the third and fourth are very thin lamellæ. The sides of all the septa are sparsely granulated. A prominent lamellar columella projects above the septal ends, to which it is fused inferiorly.

Only four examples of this coral have been collected, and their calices are all more or less worn.

Costæ answering to the first two orders of septa are represented on the wall by broad ridges, which are marked at intervals by the arched crests of the epithecal ornament.

Height of corallum, 16 mm.; length of calice, 7.5 mm.; breadth of calice, 6.5 mm.

Locality, &c.—Rare in the Eocene clays at Brown's Creek, Aire R. district.

Ceratotrochus clinatus, *spec. nov.* Pl. ii., figs. 3*a*, *b*.

The corallum has an arched outline, is free, twice as long as broad, and tapers gently to an abrupt base, which is about two-thirds of the calice in size. A younger and narrower individual has the curve of the corallum continued fully one-third further, and tapers off more rapidly to a rounded point, thus becoming slightly longer than the older form. The latter has not been fractured during fossilization, as the under surface at the base is covered by the epitheca. The calice is subplane and elliptical, its major and minor axes being as 100 to 77.

There are in all 38 septa, and the number on either side of the longitudinal axis is unequal. They are in six systems with four cycles, but the quaternaries are developed in the end systems only, while one of these is incomplete in regard to two septa. For the size of the coral the septa are stout, and the calice is well filled by them. The primaries and secondaries are equal, and the others diminish according to order. All are exsert, more or less curved, and marked by several rows of small granules. The columella is short but broad, lobed at its free surface, and fascicular inferiorly. In the type, which has otherwise an almost perfect calice, only one out of three lobes is intact, but the fractured surfaces of the others

can still be seen. A transverse section of another example shows a large columella, almost solid, and fused with the principal septa.

The wall is stout, and is furnished with a shining epitheca, delicate superiorly, but both thicker and rougher towards the base. Apparently it wears away easily, as only half of the type corallum is now covered by epitheca, and the other two specimens collected have none. The costæ, which correspond to the septa, are equal, closely set, and in the upper half of the corallum faintly visible beneath the epitheca. Where this is wanting they can be traced almost or quite to the base, and near the calice become comparatively prominent.

The dimensions of the type are:—Height of corallum, 9 mm.; length of calice, 4.5 mm.; breadth of calice, 3.5 mm.

Locality, &c.—Rare in the Eocene of Brown's Creek.

Genus Pleuropodia, *nov.*

Corallum simple, cylindrical, ultimately free, with a rounded, costulate base. Gemmation occurs from the wall and probably also from a strobila or nurse-stock. The calice is circular and shallow. Septa moderate in number, subequal, dentate, and granulose. There are prominent pali and a papillary or fascicular columella. Costæ distinct, but interrupted by collarettes of epitheca. Endotheca scanty.

This genus is formed to receive a single species of small corals collected chiefly in the Cape Otway beds. By their calices they are allied to *Cladocora*, but with a single exception, where a lateral bud is attached to the wall, the coralla are free. In one individual (pl. II., fig. 4*c*), a central constriction of the corallum strongly suggests strobilation or growth followed by separation from a strobila or nurse-stock, as observed by various authors in *Fungia*.* Moreover, several of the young subdiscoid forms in the collection resemble the superior half of this corallum, and it is at least probable that they are detached buds from a parent stock. At the same time there are also a few long cylindrical coralla, with a similar costulate base, but not showing signs of division.

Pleuropodia Otwayensis, *spec. nov.* Pl. ii., figs. 4*a*, *b*, *c*, *d*.

The corallum varies in height from almost discoid to tall, the latter forms being sometimes slightly bent. The base is generally tumid, and invariably costulate. The unique example from the Adelaide bore has a minute fragment of rock adhering to part of the base, but the usual costulations are well marked on the free portion.

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* Bourne terms the parent in *Fungia* a nurse-stock. Q.J. Micro. Sci. vol. XXVII., n.s., p. 294.

The epitheca is in bands, is variable in amount, and covers more or less constricted portions of the corallum. It commonly surrounds the calice, but may be entirely absent in very short, subdiscoid forms. The costæ are equal, granular, and prominent. They correspond to the septa, and except on the inferior part of the corallum are occasionally concealed by the banded epitheca.

The septa are short, dentate, strongly granulose, and vary in number from 24 in young to 32 or 34 in adult examples. They are in six systems with four cycles, but the higher orders are incompletely developed. The lateral bud has only the three first orders of septa present, and its calice presents a more symmetrical appearance than that of the parent, where septa of higher orders are irregularly developed. Similarly the subdiscoid forms have only the principal orders of septa present in their calices.

The pali are large, irregular in shape, and placed as a rule before the primary and secondary septa. The columella, though usually papillary, is fascicular in one or two worn calices. There may be numerous small papilli, or a few larger ones, in which case they resemble the pali. The columella and pali are only partially developed in young calices.

A small amount of endotheca is present in some examples.

The corolla vary from 1.5 mm. to 8.5 mm. in height. Those figured are respectively 8 mm., 6 mm., and 3 mm. high. The calices are all about 3 mm. in diameter, except that of the bud, which is smaller. The base varies in diameter from 3 mm. to 4 mm.

Locality, &c.—Eocene. From the Cape Otway beds, 12 examples; Wilkinson's No. 4, one example. A single specimen also from the Adelaide bore.

EXPLANATION OF PLATES.

Plate I.

Fig.
1. *Trochocyathus Maplestonei*—*a*, corallum, 3 diam.; *b*, calice, 6 diam.
2. *Trochocyathus infracompressus*—*a*, corallum, 3 diam.; *b*, calice of a smaller example, 6 diam.
3. *Trochocyathus planicostatus*—*a*, corallum, 3 diam.; *b*, calice, 6 diam.
4. *Trochocyathus Adelaidensis*—*a*, corallum, 3 diam.; *b*, transverse section of the calice of another specimen, 6 diam.

Plate II.

1. *Placotrochus Pueblensis*—*a*, corallum, 2 diam.; *b*, calice, 4 diam.
2. *Placotrochus inflectus*—*a*, corallum, 2 diam.; *b*, outline of the same, nat. size; *c*, calice (much worn) of another specimen, 4 diam.
3. *Ceratotrochus clinatus*—*a*, corallum, 3 diam.; *b*, calice, 7 diam.
4. *Pleuropodia Otwayensis*—*a*, corallum of short specimen with lateral bud, 4 diam.; *b*, calice of the same, 10 diam.; *c*, corallum showing probable strobilation, 4 diam.; *d*, outline of tall bent corallum, nat. size.

Descriptions of New Species of Xysmatodoma, &c.

By Oswald B. Lower, F.E.S. (Lond.), &c.

[Read September 8, 1903.]

BOMBYCINA.

LYMANTRIADÆ.

Anthela rubicunda, Swin.

(*Darala rubicunda*, Swin., Ann. Mag., N.H., ix., p. 419, June, 1902. *Anthela phœnicias*, Turn., Tr. Royal Soc., S.A., p. 182, July, 1902.)

Roebourne, W.A.; Mackay, Brisbane. Duaringa, Queensland; Palmerston, Northern Territory.

The late Mr. G. Barnard bred this species from larvæ feeding on *Eucalyptus sp.*

NOCTUIDÆ.

AGARISTINÆ.

Idalima placodes, Low.

(*Cruria* (?) *placodes*, Low., Trans. Roy. Soc., p. 30, 1903.)

Idalima hemiphragma, Low.

(*Cruria hemiphragma.*, *ib.*, *l.c.*, 1903.)

I refer both these species to Turner's genus *Idalima*; the latter species has a strong broad conical horny projection from forehead; and the former has a similar, but much more feeble appendage. I would have referred *hemiphragma* to *Coenotoca*, Turn., but it has no abdominal crests, but the frontal projection and neuration are exactly as in that genus, and it is highly probable that when allied forms are discovered this latter genus will have to be merged into the former.

HOMOPTERINÆ.

Grammodes pulcherrima, Luc.

(P.L.S., N.S.W., p. 258, 1892.)

Grammodes minor, Swin.

Grammodes Clementi, Swin., Ann. Mag., N.H., viii., 133, 1901.

Grammodes ocellata, Tepp.

(Nat. Ins., S.A., p. 46, 1890. *Grammodes excellens*, Luc., P.L.S., N.S.W., p. 257, 1892.)

Brisbane, Queensland; Adelaide, S. Australia; Derby, Western Australia; Broken Hill, N.S. Wales.

MOLOPA PLANALIS, Swin.

(Ann. Mag., N.H., ix., p. 421, 1902. *Churia thermodes*, Low., Tr. Roy. Soc., S.A., p. 34, 1903.)

Derby and Roebourne, Western Australia; Tennant's Creek, S. Australia.

Hampson refers this to *Churia*.

HYPENINÆ.

PRIONOPHORA RHODINASTIS, Meyr.

(Tr. Ent. Soc., Lond., p. 44, 1902. *Marapana rhodea*, Turn., Tr. Roy. Soc., S.A., p. 15, 1903.)

Queensland and New Guinea.

GEOMETRINA.

SELIDOSEMIDÆ.

THALAINODES, Low.

In the generic description, it was inadvertently stated that the male possessed a fovea. Such is not the case.

GEOMETRIDÆ.

EUCHLORIS DICHROA, n. sp.

Male and female, 18-22. Head and face orange, fillet snow-white, antennæ white, pectinations ochreous 6. Palpi white. Thorax and abdomen pale yellowish-green, beneath white. Legs white, posterior tibiæ not thickened. Forewings elongate, triangular, termen oblique, 3 and 4 separate, 6 out of 9 near base, 11 free; pale yellowish-green; extreme costal edge snow-white, edged beneath throughout with orange, not so well developed in female; about 6 fine waved whitish transverse lines, reaching margins, first 3 antemedian, others post-median leaving centre of wing with clear ground color; cilia pale yellow, terminal half whitish. Hindwings with termen rounded; 6 and 7 short stalked; color, markings and cilia as in forewings.

Mackay, Queensland; two specimens in November.

LEPTOMERIS ISODESMA, n. sp.

Female, 20 mm. Head and face fuscous, antennæ whitish-ochreous, fillet white. Palpi greyish-fuscous. Thorax whitish-ochreous. Legs whitish ochreous, anterior pair fuscous-tinged, all spurs present. Forewings elongate, triangular; pale whitish ochreous; markings pale fuscous, gently waved throughout; a line from costa at one-fourth to one-fourth

dorsum; another from beyond middle of costa to beyond middle of dorsum, and two others close together and parallel near beyond; a similar line just before termen; a very small fuscous discal dot, between first and second lines; a row of black dots along termen; cilia ochreous-white. Hindwings with termen rounded, color and all markings, except first lines, as in forewings.

Broken Hill, N.S. Wales; two specimens in October.

PYRALIDINA.

PYRAUSTIDÆ.

PIONEA LEUCOTYPA, n. sp.

Male, 16 mm. Head, palpi, antennæ, and thorax light fuscous, palpi internally and at base white. Legs white, anterior tibiæ and tarsi infuscated, abdomen fuscous, white beneath, with a lateral row of black dots. Forewings elongate, moderately dilated termen gently rounded, oblique; brownish, somewhat fuscous tinged; a very strongly outwardly curved dull whitish streak, from costa at one-sixth to dorsum at one-third, most pronounced on dorsum; a well developed clear white fascia from costa at five-sixths to dorsum before anal angle, curved outwards beneath costa, and finely edged more or less throughout with fuscous; a small fuscous dot in the disc beyond middle, nearer costa than dorsum; a row of obscure blackish praeterminal dots; cilia fuscous-whitish. Hindwings pale greyish, becoming fuscous tinged around termen and apex, and with a few praeterminal dots as in forewings; cilia grey-whitish, basal half fuscous.

A distinct species, well characterised by the white fascia. It is highly probable that the first streak will be better developed in fresher specimens.

Mackay, Queensland; one specimen in October.

PIONEA ACHROA, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, and abdomen dark fuscous, palpi beneath grey-whitish, abdomen beneath ochreous-grey. Legs grey-whitish, suffused with light fuscous above. Forewings elongate triangular, termen obliquely rounded; dark fuscous; lines obscured by general ground color; a small ochreous spot on costa at three-fourths, from which proceeds a faint dark fuscous waved line, somewhat curved outwards on upper half; cilia dark fuscous, darker on basal half. Hindwings dark fuscous; cilia as in forewings.

An obscure species, devoid of any special characteristic.

Brisbane, Queensland; one specimen (? January).

TIRATHABA CHLOROSEMA, n. sp.

Female, 30 mm. Head, palpi, antennæ, and thorax pale flesh color, palpi imperfect. Abdomen ochreous-yellow, fleshy-white beneath. Legs fleshy-white. Forewings elongate, moderate, costa gently arched, termen nearly straight; flesh color, fuscous tinged; a dull, dark greenish mark below costa at one-fourth; a large similar-colored patch, somewhat triangular shaped, in a direct line beyond, and two smaller ones, somewhat confluent still further beyond, but in a direct line with others; an interrupted line along termen and apical fourth of costa; cilia fleshy-ochreous. Hindwings with apex slightly prominent; shining ochreous-yellow, becoming fuscous-tinged around apex, and narrowly along termen; cilia ochreous-grey, darker at base.

This insect agrees fairly well with the characters of *rufivena*, Walk., but the palpi, being damaged, it may not be the correct generic location. It is not unlike that insect, but is quite distinct by the absence of scarlet neural streaks, and apparently shorter palpi.

Mackay, Queensland; one specimen in March.

EPIPASCHINÆ.

ORTHAGA ATRIBASALIS, Warr.

(Ann. Mag. Nat. Hist. (6), xvi., p. 461. *Stericta leucodesma*, Low., Trans. Roy. Soc., S.A., p. 156, 1896.)

Queensland.

ORTHAGA SEMINIVEA, Warr.

(Ann. Mag. N. Hist. (6), xvi., p. 463. *Stericta chionopa*, Low., Trans. Roy. Soc., p. 155, 1896.)

Queensland.

I had not seen Warren's paper at the time I described the above.

TORTRICINA.

TORTRICIDÆ.

AROTROPHORA COSMOPLACA, n. sp.

Male, 14 mm. Head, palpi, and thorax bright reddish-orange, palpi internally whitish. Antennæ and abdomen fuscous. Legs whitish, faintly fuscous tinged. Forewings elongate, moderate, costa rather strongly arched, termen nearly straight; bright ochreous-orange, becoming mixed with ferruginous-purplish on posterior two-thirds; a large pale golden yellow triangular patch on costa in middle, rather broadly edged anteriorly by a purplish-fuscous suffused fascia, which extends to middle of dorsum, posteriorly narrowly edged by lighter reddish-orange; cilia orange, becoming reddish at

base and fuscous purple around anal angle. Hindwings and cilia pale whitish-grey.

A beautiful species; distinct by the brilliant coloring and yellow triangular costal patch.

Perth, Western Australia; one specimen received from Mr. S. Angel, taken in November.

TINEINA.

ŒCOPHORIDÆ.

HELIOCAUSTA EPISARCA, n. sp.

Male, 34 mm. Head and thorax ochreous-reddish. Palpi carmine-pink, internally and at base white. Antennæ ochreous, basal third carmine above, abdomen ochreous-whitish. Legs ochreous-whitish, anterior pair, except coxæ, carmine. Forewings elongate, rather broad, costa rather strongly arched, termen not oblique; 7 to termen, just below apex; dull ochreous-reddish; costal edge bright carmine throughout; a dull purplish-fuscous moderate transverse oblique fascia from just beneath costa at one-third to beyond middle of innermargin, broadest below; a purplish-fuscous discal spot at two-thirds in middle; a very faintly indicated fuscous line from costa at three-fourths, thence curved outwards and ending at anal angle; cilia purplish fuscous. Hindwings pale ochreous, cilia pale ochreous, becoming fuscous tinged on basal half on upper half of termen.

Apparently between *parthenopa* and *euselma*, Meyr., but differs from both in the presence of the fascia. It has the facies of a *Euchætis*, but veins 3 and 4 of hindwings are not separate at origin.

Melbourne, Victoria; one specimen in October.

HELIOCAUSTA PERICOSMA, n. sp.

Male, 30 mm. Head, thorax, and abdomen light ochreous. Palpi and antennæ light carmine, palpi internally whitish, antennal ciliations nearly 3. Legs yellow, anterior pair carmine-pink. Forewings elongate, rather broad, costa rather strongly arched, termen nearly straight, 7 to just below apex; light ochreous, strongly tinged with yellow; costal edge bright carmine throughout; a small dull purplish-ferruginous spot on fold in middle; a large, well-defined similar colored spot in middle of wing at two-thirds from base; termen faintly and narrowly suffused throughout with light carmine, which color is more or less continued along innermargin to middle; cilia pale salmon pink. Hindwings light golden-yellow; 3 and 4 from a point, 5 somewhat approximated to 4 at base; cilia yellowish, lighter around apex.

Another species with the facies of a *Euchætis*, which is probably its true generic location, as in markings it reminds one of *E. iobola*, Meyr.

Kewell, Victoria; one specimen in April.

Type in Coll., *Kershaw*.

Hoplitica rhodopepla, n. sp.

Male, 25 mm. Head, thorax, and palpi light fleshy-red, palpi internally and at base white. Antennæ ochreous, at base fleshy-red. Abdomen dull ochreous, segmental margins whitish. Legs ochreous, anterior pair light fleshy-red, coxæ white. Forewings elongate, moderate, costa moderately arched termen slightly oblique, 7 to apex; light fleshy-red; a small fuscous dot in disc at one-third, a second, hardly traceable, below and beyond, and a third in disc at two-thirds; costal edge deeper than ground color, extreme costal edge whitish from one-third to beyond middle; cilia light fleshy-red. Hindwings whitish-ochreous, with an obscure fuscous suffusion at apex and more or less continued narrowly to middle; cilia whitish-ochreous, becoming fuscous tinged around apical portion.

This is a neatly marked species recalling *pudica*, Meyr., in general appearance, but without the large discal dot of that species. The second spot is practically absent in the specimen before me; probably other specimens may show it.

Dubbo, New South Wales; one specimen in June.

Eulechria atradelpha, n. sp.

Female, 24 mm. Head, palpi, antennæ, and thorax dark fuscous, palpi whitish internally, basal half of second joint whitish, thorax with an obscure transverse whitish median fascia. Legs dark fuscous, posterior pair mixed with ochreous-whitish. Abdomen dark fuscous, with whitish segmental rings, well defined. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; dark fuscous, finely irrorated with somewhat bluish-white scales; base of wing darker fuscous; a moderately broad, straight transverse black fascia, from one-third of costa to one-third dorsum, edged by its own width, with clear white anteriorly, hardly reaching margins; a black transverse fascia from costa at two-thirds to dorsum at anal angle, becoming dilated into an oval ring in middle, centre filled with ground color; some blackish scales towards termen; cilia dark fuscous. Hindwings with veins 3 and 4 from a point; fuscous-purplish, lighter towards base; cilia fuscous, with a darker median line.

Closely allied to *thermistis*, Low., of which it may be the female, as the markings are almost identical in position, and

the general coloring is somewhat similar on the forewings; the hindwings, however, are totally different, being bright orange in that species. I am rather inclined to place this species in *Œnochroa*, but as the thorax and palpi are different, I place it here, not forgetting, however, that the sexual differences in some species of *Œnochroa* are very marked in the hindwings, and possibly when further material is available the generic location will need to be rectified.

Stawell, Victoria; one specimen in November.

Linosticha myriospila, n. sp.

Male, 25 mm. Head, antennæ, and thorax grey, face somewhat whitish, thorax mixed with a few blackish scales. Palpi grey, whitish internally. Abdomen light fuscous. Segments silvery-grey, strongly margined on sides. Legs grey-whitish, tarsi blackish, ringed with white. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 to apex; grey, with minute scattered blackish scales; markings black; a dot on base; a second on fold at one-sixth from base; a third on fold beyond one-third, a fourth above and obliquely before; and two others transversely placed in disc at two-thirds; a praeterminal row of well-defined dots, continued around apex and along costa to just above the two transversely placed dots; indications of a parallel row anterior to praeterminal series; cilia grey. Hindwings pale greyish-fuscous, paler on basal half; cilia greyish-fuscous.

Not very near any other described species; it approaches *Hoplitica myodes*, Meyr., and *Eulechria griseola*, Zell., in general appearance, but the antennæ easily distinguish it; and to *Euchætis endoleuca*, Meyr., to which it is not unlike, it is easily separated by the termination of vein 7 at apex.

Broken Hill, New South Wales; one specimen beaten from *Eucalyptus* in November.

Linosticha amphileuca, n. sp.

Male, 20 mm. Head, palpi, antennæ, and thorax fuscous-whitish, palpi fuscous externally. Abdomen fuscous, segmental margins whitish. Legs fuscous-whitish, posterior pair paler. Forewings elongate, moderate, costa hardly arched, termen rounded, strongly oblique; white, suffusedly mixed with fuscous; the fuscous tends to accumulate and forms a moderately thick streak from beneath costa at base to three-fourths of costa, leaving extreme costal edge white, and a white streak above fold; a suffused fuscous streak along fold; a fuscous transverse line from costa at three-fourths to inner-margin near anal angle, indented beneath costa; cilia white, mixed with fuscous on basal half. Hindwings pale greyish-

fuscous; cilia white, with some fuscous scales along basal portion.

Not very near any other, perhaps most allied to *pudica*, Low., but very different in form of wing.

Birchip, Victoria; one specimen in April (*D. Goudie*).

PHILOBOTA OCHROLITHA, n. sp.

Male, 14 mm. Head, thorax, and palpi ochreous-white, terminal joint of palpi fuscous externally. Antennæ fuscous, basal fifth ochreous-white. Abdomen fuscous, segmental margins ochreous-white. Legs ochreous-white, posterior pair ochreous, hairs of posterior pair dense, ochreous. Forewings elongate, moderate, costa gently arched, termen rounded, oblique; clear ochreous; extreme costal edge fuscous, from base to one-third; cilia light ochreous-fuscous. Hindwings greyish-fuscous, cilia light ochreous.

Recalls in general appearance specimens of *Clerarcha* (*Xyloryctidæ*).

Duaringa, Queensland (opposite Railway Station); one specimen in November.

PHILOBOTA HEMICROCA, n. sp.

Male, 24 mm. Head and thorax yellowish, thorax suffused with orange. Palpi fuscous, internally yellowish on second joint. Antennæ fuscous, obscurely spotted with white. Abdomen dark fuscous. Legs fuscous, posterior pair dull ochreous-fuscous. Forewings elongate, moderate, costa moderately arched, termen oblique, hardly rounded; pale yellow, somewhat mixed with orange at base, and around margins; an inwardly oblique ferruginous spot on anal angle, hardly reaching half across wing; cilia fuscous. Hindwings and cilia fuscous; cilia paler at base.

Somewhat allied to *Monadelta*, Low., but easily separated by the clear yellow and fuscous cilia of forewings.

Stawell, Victoria; one specimen in October.

PHILOBOTA OXYSEMA, n. sp.

Male, 18 mm. Head, palpi, and thorax whitish, palpi externally fuscous. Abdomen whitish. Antennæ whitish, spotted with fuscous. Legs fuscous whitish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; white, with minute scattered fuscous scales; markings fuscous; extreme costal edge fuscous towards base; a dot in cell at one-third from base; an inwardly oblique transverse narrow fascia from anal angle to two-thirds across wing; a suffused spot on costa at four-fifths; a narrow streak before and parallel to termen nearly touching previous spot; a nar-

row line along termen and apical fourth of costa; cilia whitish with a fuscous median line, becoming darker around apical portion. Hindwings greyish-fuscous, cilia whitish, with a fuscous median line.

Not unlike some species of *Nephogenes*.

Broken Hill, New South Wales; one specimen in January.

SAROPLA POLIOCHRA, n. sp.

Male, 20-25 mm. Head and palpi very dull ochreous-whitish, palpi fuscous externally. Thorax fuscous, patagia ochreous-whitish. Antennæ and abdomen fuscous. Legs fuscous, posterior pair whitish-ochreous, anterior and middle tibiæ and tarsi ringed with whitish. Forewings elongate, moderate, somewhat dilated posteriorly, costa gently arched, termen rounded, strongly oblique; dull greyish-ochreous-whitish, more or less minutely irrorated with blackish scales, which sometimes tend to accumulate along veins; a black dot in disc at one-fourth, a second below and before on fold; a moderately large curved black spot at end of cell; a row of praeterminal black spots, continued to apical fourth of costa; cilia greyish-ochreous. Hindwings greyish-fuscous; cilia grey.

Closely allied to *paracycla*, Low., but differs by longer palpi, different ground color of both forewings and hindwings and absence of ochreous costal edge. *Paracycla* varies, but never to the extent of considering the present species a variety of it.

Stawell, Victoria; two specimens in March.

CÆSYRA MACULOPA, n. sp.

Female, 15 mm. Head, palpi, and thorax white, thorax infuscated, antennæ fuscous, white at base. Abdomen and legs white. Forewings rather short, broad, costa gently arched, termen oblique, faintly sinuate beneath apex; greyish-fuscous, more or less mixed with white; a moderately narrow oblique fuscous transverse fascia, edged posteriorly by its own width of white, from costa before middle to middle of inner-margin, narrowest in middle; a dark fuscous rounded spot-like patch beneath apex, edged anteriorly by a whitish streak, cilia whitish, becoming fuscous towards terminal portion. Hindwings light grey; cilia grey.

Not near any other species of the genus; it may not be its correct generic location, and the male may show additional characters. It agrees, however, in the characters of *Cæsyra*.

Halbury, South Australia; one specimen in November.

Aristeis macrotricha, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, abdomen, and legs dark fuscous, head with some ochreous hairs, palpi internally slightly ochreous tinged, posterior legs yellow. Forewings elongate, moderate, costa moderately arched, termen slightly rounded, oblique, 7 to termen; dark coppery fuscous; a moderately broad oblique transverse ochreous fascia, from costa in middle to innermargin beyond middle, sometimes absent; cilia deep coppery fuscous, terminal half yellowish, except around anal angle. Hindwings yellow; a fuscous apical patch, more or less continued along termen throughout; innermargin rather broadly fuscous; cilia fuscous.

Distinct from the other described species. The occasional absence of the ochreous fascia of forewings is peculiar; the antennal ciliations are as in *hepialelella*, Walk., and are much shorter on terminal third, reminding one of species of *Linosticha* (especially *dichroa*, Low.), but the absence of pecten and different position of vein 7 of forewings are sufficient characters to remove it from that genus.

Stawell, Victoria; two specimens in October. I have one poor sp. taken at Tarrawingee, near Broken Hill.

Ocystola paralia, n. sp.

Male, 14 mm. Head, palpi, and antennæ white, palpi fuscous externally, half of second, antennal ciliations 3½. Thorax grey, patagia white. Abdomen greyish-white. Legs whitish, anterior pair mixed with fuscous, posterior ochreous-tinged. Forewings elongate, moderate, costa gently arched, apex tolerably pointed, termen oblique; white with fuscous markings; extreme costal edge fuscous on basal third; and slightly inwards curved narrow fascia from dorsum before middle to slightly more than half across wing, becoming spot-like at apex, and obscure on dorsum; a spot on dorsum before anal angle; a spot at anal angle and another immediately above and oblique before it, almost touching preceding spot; cilia whitish ochreous, strongly mixed with fuscous on median third. Hindwings with veins 3 and 4 from a point; shining whitish; cilia pale whitish-ochreous.

Very near *trilicella*, Meyr., but differs by the palpi, grey, not fuscous, thorax and antennal ciliations being shorter.

Melbourne (Domain), Victoria; one specimen in October.

Acompsia mesozona, n. sp.

Female, 20 mm. Head and palpi whitish yellow. Thorax purplish-fuscous, posterior half whitish-yellow, antennæ fuscous. Abdomen fuscous, beneath ochreous, anal tuft yel-

lowish. Legs ochreous, anterior pair fuscous. Forewings elongate, moderate, costa gently arched, termen rounded, very oblique; 7 to costa, just above apex, 2 from well before angle of cell, 3 from angle; whitish yellow, with dull purplish-fuscous markings; a very narrow basal streak, hardly reaching innermargin; a moderate, straight, transverse fascia, from middle of costa to middle of innermargin, slightly dilated on costa; a moderately large apical patch, anterior edge somewhat darker fuscous, from costa at three-fourths to innermargin at anal angle, moderately projecting in middle; cilia ochreous, mixed with fuscous, becoming wholly fuscous around anal angle. Hindwings with veins 3 and 4 from a point; fuscous, somewhat bronzy-tinged; cilia yellow.

Not approaching any other described species; in general appearance recalling a *Philobota*.

Stawell, Victoria; one specimen in October.

BORKHAUSENIA CALLIOPTIS, n. sp.

Female, 16 mm. Head, palpi, antennæ, thorax, abdomen, and legs ashy-grey-fuscous, palpi spotted with white, antennæ with rather strong pecten, posterior legs ochreous, anterior and middle tarsi ringed with whitish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded, 7 to costa, 2 and 3 separate; ashy-grey-fuscous, becoming grey-whitish on margins; a very obscure fuscous spot in middle of wing at one-third from base; a second in disc at two-thirds; and a third on fold below and between; cilia ashy-grey-whitish. Hindwings yellow; cilia yellow, mixed with fuscous, especially around apex.

Very like *Œnochroa endochlora*, Meyr., but the termination of vein 7 on costa is a reliable point of distinction.

Birchip, Victoria; one specimen taken in April, received from Mr. D. Goudie.

GUESTIA (?) ISCHNOTA, n. sp.

Male, 14 mm. Head, palpi, antennæ, thorax, legs, and abdomen greyish-fuscous, posterior legs grey-whitish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 2 and 3 stalked, not connected with 3; 7 and 8 stalked, 7 to costa; greyish-fuscous, finely irrorated, with fuscous scales; a small fuscous dot above fold at one-third, a second just below and a third in disc at two-thirds; cilia greyish-fuscous. Hindwings grey-whitish; cilia grey, with a faint fuscous-median line.

An obscure species; doubtfully referable to *Guestia*, the pecten of antennæ appears to be absent, but may be developed in fresher specimens.

Broken Hill, New South Wales; one specimen in September.

GUESTIA AMYDROSEMA, n. sp.

Male, 22 mm. Head, palpi, antennæ, and thorax greyish-ochreous, second joint of palpi whitish-ochreous at apex. Abdomen grey. Legs fuscous, more or less banded with whitish, posterior pair grey. Forewings elongate, moderate, costa gently arched, termen rounded, oblique; greyish-ochreous, very minutely irrorated with fuscous; markings dark fuscous; a narrow transverse basal mark; a spot on fold just before one-third, a second obliquely above, and a third, more conspicuous in disc at two-thirds; a row of praeterminal spots, continued along apical fourth of costa; cilia greyish-fuscous, darker at base. Hindwings pale grey-whitish; cilia grey-whitish.

Reminds one of *Acompsia pseudoprettella*, Stt., but veins 2 and 3 of forewings are not stalked in that species.

Mount Wellington, Tasmania; one specimen in October.

PSECADIA HEMADELPHA, n. sp.

Female, 18 mm. Head, thorax, and patagia snow-white, face fuscous tinged, thorax with two small black dots behind collar, a narrow black transverse median bar and another black bar at posterior extremity. Palpi white, second joint black at base and apex. Antennæ blackish. Abdomen greyish-ochreous, second segment blackish with narrow white segmental rings, two posterior segments black, anal tuft white, abdomen wholly blackish beneath, becoming whitish in middle throughout. Legs whitish irregularly banded with black. Forewings elongate, moderate, costa gently arched, termen hardly rounded, oblique; 7 to just above apex; snow-white, with black markings; a short dentate edged transverse fascia near base, reaching to fold; a similar fascia from costa at one-fourth reaching three-fourths across wing, nearly straight; a spot on dorsum just anterior to this, and another above dorsum between second and third fascia; a third fascia, irregular and outwardly oblique from costa at about middle, where it is followed by a spot, to fold, interrupted below costa; a fourth fascia, similar to third, from costa at five-sixths to just above anal angle, with an elongate tooth below costa; a moderate spot before middle of termen; a more or less complete row of spots along termen and apical fourth of costa; cilia white, chequered with black. Hindwings shining snow-white, with a fuscous, apical patch; cilia white, around apex fuscous.

Differs from *postica*, Zell., by its smaller size, different arrangement of markings and abdomen.

Arltunga, Central South Australia; one specimen in November.

PSECADIA SCIAPTERA, n. sp.

Male, 22 mm. Head, face, and thorax white, collar black. Palpi blackish, internally whitish. Abdomen fuscous. Legs black, banded with white. Forewings elongate, moderate, costa gently arched, termen oblique, 7 to apex; snow-white, with black markings; a spot on costa near base; an outward curved series of three dots, from costa at one-fifth to dorsum at one-fifth; a short oblique mark on costa before middle, generally connected with spot at its extremity; a spot above dorsum before middle; a larger spot in disc at two-thirds; a somewhat triangular spot on costa at five-sixths, containing a spot of ground color in middle; a rather broad band along termen, with several spots of ground color on lower half, and with a curved tooth in middle, the extremity of which nearly touches the triangular costal spot; 2 or 3 black spots on apical fifth of costa; cilia white, basal half black. Hindwings white, apical two-fifths dark fuscous, darkest along termen; cilia as in forewings.

Differs from the other described species by the band along termen, besides other details.

Mackay, Queensland; one specimen in October.

EUDRYMOPSIS, n. g.

Head and thorax smooth. Antennæ in male (?), with small pecten. Palpi moderate, recurved, second joint tolerably smooth, not reaching base of antennæ, terminal joint shorter than second, acute. Forewings elongate; 2 and 3 stalked from angle; 7 and 8 stalked, 7 to apex or just below it. Hindwings with 3 and 4 connate; 5, 6, and 7 parallel, 8 free.

In the neighborhood of *Guestia*, but differs in neuration. I really think it should be placed next to the *Gelechiadæ*, as it recalls sp. of that group, but vein 8 of hindwing is free.

Type *E. xyloscopa*, Low.

EUDRYMOPSIS XYLOSCOPA, n. sp.

Female, 40 mm. Head, dull ochreous. Antennæ, palpi, thorax, abdomen, and legs ochreous fuscous, posterior legs yellowish, all tarsi banded with ochreous-whitish, first segment of abdomen clothed with long ochreous hairs. Forewings elongate, moderate, costa evenly arched, termen oblique; fuscous, mixed with dull ochreous, the former color forms a more or less darker patch above to rims; cilia fuscous, paler

at base. Hindwings fuscous; hairs along dorsum, long, yellowish; cilia fuscous.

Broken Hill, N.S. Wales; one specimen on bark of *Eucalyptus* sp. in October.

XYLORYCTIDÆ.

Xylorycta philonympha, n. sp.

Male and female, 30-36 mm. Head and face ochreous-orange. Thorax ochreous, posteriorly shining white, posterior two-thirds of patagia shining white. Palpi white, somewhat infuscated externally. Antennæ ochreous, ciliations of male 2. Legs whitish-ochreous, coxæ orange internally, fuscous externally, tibiæ more or less infuscated externally. Abdomen shining white, segments dull orange. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 to termen; shining snow-white; a narrow orange streak along edge of costa from base to just before apex, becoming fuscous-tinged on basal one-fourth; cilia shining snow-white. Hindwings with 3 and 4 from a point; 6 and 7 from a point; pale fuscous, becoming lighter towards base; cilia white, becoming pale ochreous at base and on costal portion.

Differs from *homoleuca*, Low. (which I have received from Derby, W.A., Townsville, Queensland, and Tasmania) by the orange streak along costa and orange head, and from *chionoptera*, Low., especially by the underside of abdomen and other points.

Broken Hill, New South Wales; two specimens in September and October.

Telecrates streptogramma, n. sp.

Male, 20 mm. Head, palpi, and thorax ochreous-orange, palpi externally fuscous, except basal two-thirds of second joint, thorax with a broad fuscous anterior band, patagia orange, fuscous anteriorly. Antennæ fuscous, ciliations nearly one-half. Abdomen fuscous-leaden, segmental margins yellowish, lateral margins yellowish. Legs ochreous-fuscous, posterior pair ochreous-yellow. Forewings elongate, moderate, costa gently arched, termen oblique, faintly sinuate beneath apex; 7 to termen; shining pale yellow, with blackish markings; costal edge narrowly blackish throughout; indistinct towards apex; a moderately broad subcostal streak from base to apex, emitting from its upper extremity at two-thirds fine lines along veins to termination; an inwardly oblique somewhat triangular spot on dorsum at anal angle; all veins between this and termen outlined with blackish; a fine line

along termen; cilia ochreous-yellow, basal half fuscous. Hindwings with veins 6 and 7 stalked dark fuscous, becoming much paler on basal one-half; cilia ochreous-yellow, becoming paler towards base, and with a faint fuscous basal line towards anal angle.

A distinct and pretty species, recalling species of *Philobota* (*Œcophoridæ*).

Gisborne, Victoria; one specimen (probably dislodged from *Casuarina*) in December. (*Coll., Lyell.*)

Agriophara tephroptera, n. sp.

Male, 28 mm. Head and thorax cinereous-grey, face white. Palpi and antennæ cinereous-grey. Abdomen ochreous-whitish. Legs whitish, anterior coxæ snow-white, anterior and middle tibiæ and tarsi dark fuscous above, tarsi banded with whitish, posterior tarsi with a few blackish bands above. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; cinereous-grey; extreme costal edge white from one-third to apex; more pronounced beneath; 4 rather oblique outwards curved series of transverse fuscous marks; first from one-fourth costa to one-fourth dorsum; second from costa at about one-third to about middle of dorsum; third from costa at three-fifths to anal angle; fourth more strongly curved and better developed, from costa at three-fourths to anal angle and there meeting third; an interrupted blackish line along termen. Hindwings pale ochreous-whitish; somewhat fuscous tinged; cilia ochreous-whitish, with fuscous subbasal and subterminal lines.

Differs from the other described species by the pale ochreous hindwings.

Broken Hill, New South Wales; one specimen in December (at light).

ELACHISTIDÆ.

Opszyga, n. g.

Head smooth. Antennæ in male thickened, about four-fifths. Labial palpi very long, recurved, second joint somewhat roughened, terminal joint longer, acute. Posterior tibiæ rough haired. Forewings elongate, pointed; vein 1 furcate at base; 7 and 8 stalked, rarely 6 out of 7 near base. Hindwings two-thirds; cilia 2½; 6 and 7 stalked.

Type, *O. eugramma*, Low.

I form this genus to receive *eugramma* described by me (P.L.S., N.S.W., 114, 1899) as a *Limnœcia*, but having obtained further material I feel justified in erecting this genus. It differs from *Limnœcia*, Stt., by the stalking of veins 6 and

7 of hindwings and antennæ. Vein 6 of forewings runs out of 7; this is probably an accidental deformity; but the neuration of hindwings is constant throughout.

LIMNŒCIA XANTHOPELTA, n. sp.

Male, 22 mm. Head and palpi orange-yellow, terminal joint of palpi blackish. Thorax and antennæ black, patagia orange-yellow. Antennal ciliations nearly 2. Abdomen orange-yellow, anterior segments blackish. Legs blackish, posterior pair orange yellow. Forewings elongate-lanceolate, moderately broad; orange-yellow, with black markings; a broad oblique fascia from costa before to dorsum at one-third; a similar fascia, somewhat broader from costa at three-fourths to anal angle, connected in middle with previous fascia by a somewhat triangular fascia, dilated anteriorly, and confluent below middle with preceding fascia; a moderate fascia along termen, narrowed on lower half; cilia blackish, with a yellowish tooth near anal angle. Hindwings elongate-lanceolate; dark fuscous; an ochreous-yellow apical spot; extreme apex fuscous; cilia orange-yellow, becoming fuscous along apical portion; costal cilia orange-yellow.

Very like species of *Macrobathra* (*Œcophoridæ*).

Broken Hill, New South Wales; one specimen in November. Mr. D. Goudie has sent me several specimens taken at Birchip, Victoria.

TINEIDÆ.

CTENOCAMPA BALIODES, Meyr.

I have a female of this species taken near Melbourne, which only differs from the male as follows:—

Size 24 mm. Antennæ filiform; underside of both wings spotted throughout with white, well defined; in the male the forewings are somewhat spotted below, but the hindwings are black above and below; the abdomen beneath is marked with narrow white segmental rings, which, although developed in the male, are more obscure. An abnormality occurs in the hindwing of the female by having vein 4 present, stalked with 5; the other wing is normal.

I have seen a male specimen from Hobart, Tasmania.

NARYCIA (XYSMATODOMA) EPICHRYSA, n. sp.

Male, 24 mm. Head yellow, face fuscous. Palpi and antennæ fuscous, palpi internally dull ochreous, antennal ciliations 1. Thorax fuscous, with a whitish median spot. Abdomen fuscous, ochreous beneath. Legs ochreous, tarsi somewhat banded with fuscous. Forewings elongate, moderate, costa gently arched, termen rather strongly oblique; 7 absent;

white, more or less spotted with fuscous, arranged in oblique transverse series; markings fuscous; costa and innermargin strigulated throughout; an outwardly oblique narrow fascia, from one-third costa reaching half across wing; an irregular rather flattened quadrate spot on middle of costa, and another similar, but smaller between this and apex, interspaces slightly ochreous-tinged on costa; a row of small spots along termen; a parallel series of spots, starting from last costal spot and terminating on innermargin at two-thirds; cilia ochreous-grey, tips darker. Hindwings fuscous; cilia as in forewings, but with a dull fuscous basal line.

Apparently nearest *protorna*, Meyr., but differs especially by the yellow head and different shape of forewings.

Melbourne, Victoria; one specimen in October.

NARYCIA (XYSMATODOMA) SEMIOTA, n. sp.

Male, 16 mm. Head, palpi, antennæ, thorax, legs, and abdomen dark fuscous, antennal ciliations 2, posterior legs ochreous fuscous, anal tuft yellowish. Forewings elongate moderate, costa gently arched, termen obliquely rounded; 7 and 8 long stalked, 7 to below apex; dark fuscous, finely reticulated throughout with blackish, the absence of which causes a moderately broad short inwardly oblique, obscure, fascia, from innermargin before middle to two-thirds across wing; costa with three or four obscure ochreous dots along posterior half; cilia greyish fuscous, basal half dark fuscous, mixed with blackish. Hindwings fuscous, rather thinly scaled; cilia fuscous, darker at base.

Nearest *lasiocola*, Meyr., differs in more sombre coloring.

Melbourne, Victoria; one specimen in May.

NARYCIA (XYSMATODOMA) HYALISTIS, n. sp.

Male, 20 mm. Head, thorax, antennæ and legs fuscous, antennal ciliations 1, posterior legs greyish. Abdomen greyish. Forewings elongate, moderately dilated posteriorly, costa gently arched, termen obliquely rounded; 7 and 8 stalked, 7 to termen; very pale grey-whitish, irregularly strigulated throughout with fuscous, thickest on margins; a faint fuscous spot above middle at two-thirds; cilia greyish fuscous. Hindwings with 4 and 5 short stalked; very pale grey, thinly scaled, almost transparent; cilia greyish.

An obscure species, devoid of any special characteristic, excepting perhaps the dilated forewings and rather clear hindwings.

Gisborne, Victoria; one specimen. (*Coll. Lyell.*)

Narycia (Xysmatodoma) campylota, n. g.

Male and female, 16-20 mm. Head, palpi, thorax, antennæ, abdomen and legs fuscous, antennal ciliations 1, posterior tibiæ and tarsi somewhat ochreous, tarsi with fuscous rings. Forewings elongate, moderately dilated posteriorly, termen obliquely rounded; 7 and 8 stalked, 7 to termen; light fuscous, more or less finely reticulated with darker fuscous; an obscure broad whitish-grey oblique transverse fascia, anterior edge from beyond one-fifth costa to one-third innermargin, posterior edge, rather suffused, from costa before middle to innermargin in middle; an obscure whitish prœterminal fascia, from below vein 7 to before anal angle; 3 or 4 fuscous, irregular quadrate spots on costa beyond middle, separate by very obscure greyish spots; cilia grey, fuscous tinged at base. Hindwings pale grey, thinly scaled; cilia as in forewings.

Somewhat similar in shape of wing to the previous species; the transverse fascia, though obscure, is noticeable and constant in the three species before me.

Flemington (male) in September, Wandins (female), Victoria; in May. (*Coll. Lyell.*)

Narycia (Xysmatodoma) callista, n. sp.

Male, 16 mm. Head yellow. Face fuscous. Thorax, palpi, antennæ, abdomen, and legs dark fuscous, antennal ciliations over 1, tibiæ and tarsi ringed with ochreous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 absent; pale yellow, markings deep purplish-fuscous; a moderately thick streak along costa from base to one-fourth, at base extended to inner margin; three moderately straight direct fasciæ; first from extremity of costal streak to innermargin at one-fourth, enclosing a quadrate spot of ground color between this and basal streak; second from middle of costa to middle of innermargin, slightly dilated on upper half and angulated outwards on posterior edge below costa, where it is inclined to be connected with third fascia; third from costa at four-fifths to anal angle; a minute spot on costa between first and second fasciæ; a small irregular spot at apex, touching posterior edge of third fascia below costa; cilia dark fuscous. Hindwings light fuscous, bronzy-tinged; cilia fuscous.

In the neighborhood of *Carlotta* and *chrysopetala*, Meyr., but not very near either; the markings are placed somewhat as in *characota*, Meyr.

Gisborne, Victoria; two specimens in November. (*Coll. Lyell.*)

NARYCIA (XYSMATODOMA) LASIOMICRA, n. sp.

Male, 8-10 mm. Head snow-white. Thorax fuscous, with a white posterior spot. Palpi and antennæ fuscous. Legs greyish-white. Abdomen whitish. Forewings with costa rather strongly arched, termen very obliquely rounded; 8 and 9 stalked, 8 to just above apex; white, minutely spotted throughout with golden-fuscous, and with dull golden fuscous markings; a moderate streak along costa from base to one-fourth, attenuated posteriorly; a rather thick outwardly oblique streak from one-third innermargin to two-thirds across wing; a slightly narrower transverse fascia from before three-fourths of costa to innermargin before anal angle, angulated outwards below middle, and sometimes interrupted just below; cilia white, with elongate streaks of fuscous. Hindwings with 3 and 4 approximated at base; 6 and 7 from a point, sometimes stalked; grey-whitish; cilia white, with a fuscous basal line.

A small though distinct and easily recognised species, the white head being very conspicuous.

Derby, Western Australia; two specimens in April. Mr. Lyell has it from Townsville, taken in October, presumably sent by Mr. F. P. Dodd.

NARYCIA (XYSMATODOMA) EUSCIA, n. sp.

Female, 16 mm. Head, palpi, thorax, antennæ, and abdomen dark fuscous, anal tuft ochreous. Legs fuscous, posterior greyish-ochreous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 and 8 stalked, 7 to termen; pale ochreous, with fuscous markings; a moderately broad basal patch, outer edge oblique, from costa at one-fourth to before one-third innermargin; a moderately broad oblique fascia, from costa before middle to innermargin in middle, broadest below; a triangular patch on costa at about three-fourths, containing a spot of ground color on costa, somewhat connected with posterior edge of median fascia below middle; a transverse prœterminal fascia, somewhat curved inwards; a fine line along termen; cilia fuscous. Hindwings with 4 and 5 from a point; greyish-fuscous; cilia fuscous.

Gisborne, Victoria; one specimen in May. (*Coll. Lyell.*)

LEPIDOSCIA EURYSTOLA, n. sp.

Male, 14 mm. Head, palpi, antennæ, thorax, legs and abdomen dark fuscous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; 7 absent; fuscous, with obscure whitish markings; an inwardly oblique fascia, from costa at two-thirds to fold at one-fourth from base, upper por-

tion tolerably defined, lower suffused; a small patch on anal angle; a fuscous spot somewhat above apex of this; a thick fascia along termen, hardly reaching anal angle; cilia fuscous, darker at base. Hindwings with 4 absent; pale fuscous, thinly scaled; cilia greyish-fuscous, darker on basal half.

Melbourne (near Flemington); one specimen, in June.

LEPIDOSCIA PLACOXANTHA, n. sp.

Male, 20 mm. Head yellow. Palpi, antennæ, thorax, legs, and abdomen deep fuscous-purple. Forewings elongate, moderate, costa gently arched, termen rounded, rather strongly oblique; 7 absent; deep purplish fuscous; a broad yellowish somewhat triangular fascia, from innermargin before middle to before middle of costa, broadest on innermargin; a faintly outlined yellowish patch in middle of wing at four-fifths from base; cilia ochreous-fuscous, basal half deep purplish fuscous. Hindwings fuscous; cilia fuscous.

Not very near any other described species, it bears some resemblance to species of *Chrysoryctis*.

Gisborne, Victoria; one specimen, in September. (*Coll. Lyell.*)

LEPIDOSCIA POLYCHRYSA, n. sp.

Male, 10 mm. Head, palpi, antennæ, thorax, legs, and abdomen dark fuscous, posterior legs ochreous. Forewings elongate, moderate, costa arched, termen rounded, oblique; 7 and 8 stalked, 7 to termen; fuscous, irregularly irrorated with golden-ochreous scales; a large irregular-quadrate patch of dull golden metallic close to base, nearly reaching costa, broadest below; a small similarly colored patch on costa in middle, a second on costa at two-third, and a smaller one just beyond; a row of dull golden-metallic oval spots along termen; cilia fuscous, mixed with golden ochreous. Hindwings with termen rounded; pale ochreous, with golden reflections; cilia fuscous.

Nearest *chloropetala*, Meyr., but distinct by hindwings.

Wandin, Victoria; one specimen in May. (*Coll. Lyell.*)

LEPIDOSCIA TRILEUCA, n. sp.

Male, 16 mm. Head ochreous. Palpi, antennæ, thorax, legs, and abdomen fuscous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded, 7 absent; pale whitish, with dull fuscous markings; a moderate basal patch, outer edge from one-fourth costa to one-fourth innermargin indented above innermargin; a broad transverse fascia, from middle of costa to middle of innermargin, sometimes indented beneath costa on posterior edge, and with a fine whitish line

in middle on lower half, a similar fascia before termen, sometimes interrupted on lower half; an irregular line along termen; cilia fuscous. Hindwings fuscous, cilia greyish-fuscous.

Gisborne, Victoria; two specimens in October. (*Coll. Lyell.*)

NARYCIA (XYSMATODOMA) PHOTIDIAS, n. sp.

Male, 16 mm. Head dull ochreous. Palpi, thorax, and abdomen dull coppery-fuscous. Antennæ fuscous. Legs ochreous, suffusedly banded with fuscous. Forewings elongate, moderate, costa gently arched, termen strongly oblique; ochreous, somewhat shining, fine strigulated with pale fuscous; costa obscurely spotted on posterior half; fuscous dot in disc at one-third, a second beyond end of cell, sometimes a clearer ochreous space on costa above; a similar inwardly oblique space on innermargin at two-fifths; a suffused row of fuscous spots along termen; cilia shining ochreous, mixed with fuscous. Hindwings light fuscous; cilia fuscous.

Gisborne, Victoria; two specimens in June. (*Coll. Lyell.*)

NARYCIA (XYSMATODOMA) EPITRICHA, n. sp.

Male and female, 13 mm. Head ochreous yellow. Palpi, antennæ, thorax, abdomen, and legs blackish, thorax faintly purplish tinged, abdomen of female strongly dilated and densely haired on posterior segments, anal tuft black. Forewings elongate, moderate, costa gently arched, termen oblique, hardly rounded; 7 and 8 stalked; deep purple blackish, with ochreous markings; a moderate oblique fascia from costa before one-third to innermargin at one-third; an irregular triangular spot on costa at two-thirds; an erect spot on innermargin before anal angle, nearly touching previous spot; a narrow fascia along termen, narrowest below, hardly reaching innermargin; in male all markings are obscured except first fascia; cilia dark fuscous. Hindwings and cilia dark fuscous.

Nearest *glabrella*, Walk., in size and position of markings.

Melbourne, Victoria; two specimens in March.

NARYCIA (XYSMATODOMA) GASTROMELA, n. sp.

Male, 24 mm. Head whitish. Palpi, antennæ, thorax, and legs dark fuscous, posterior legs mixed with whitish. Abdomen fuscous, strongly mixed with black, especially beneath, anal tuft grey. Forewings elongate, moderate, costa rather strongly arched, termen obliquely rounded; 7 and 8 long stalked, 7 to apex; dull whitish-fuscous, finely irrorated throughout with blackish; dots more or less arranged in transverse fuscous fascia, from one-third of costa to middle of dorsum, very obscure on lower half, edged anteriorly by a rather

broad suffused whitish fascia; cilia greyish-fuscous. Hindwings greyish-fuscous; 6 and 7 closely approximated at base; cilia greyish-fuscous, becoming darker fuscous on basal half.

Somewhat allied to *adelopis*, Meyr., but very distinct by the neuration. The wings are shaped as in *euryptera*, Meyr.

Bathurst, New South Wales; one specimen, in April.

NARYCIA (XYSMATODOMA) TRIZONA, n. sp.

Male, 22 mm. Head yellowish-ochreous, palpi ochreous, basal half of second joint fuscous. Thorax and antennæ fuscous, ciliations nearly 2. Legs fuscous, tibiæ and tarsi irregularly banded with ochreous. Abdomen greyish-fuscous. Forewings elongate, moderate, costa rather strongly arched, apex obtuse, termen somewhat obliquely rounded; 7 absent; white, with blackish markings; costal edge faintly yellowish throughout, more pronounced beneath; a broad oblique basal fascia, outer edge irregularly waved; a broad oblique fascia from costa at one-third to before middle of innermargin; a similar fascia from three-fourths of costa to above anal angle, obscure on lower half; an irregular patch at apex; rest of wing more or less finely spotted; cilia fuscous (imperfect). Hindwings and cilia dark fuscous.

Stawell, Victoria; one specimen, in March.

LEPIDOSCIA BARYSEMA, n. sp.

Female, 26 mm. Head, palpi, antennæ, thorax, and legs dark fuscous. Forewings elongate, moderate, costa gently arched, apex round-pointed, termen rather strongly oblique; 7 and 8 stalked, 7 to termen; grey-whitish, irregularly and transversely strigulated with rather thick blackish streaks, more or less interrupted into spots, these spots coalesce on dorsum at one-fourth to form a somewhat quadrate spot; two transverse fascia before and beyond middle, and a narrow fascia from four-fifths costa to anal angle; cilia greyish-fuscous. Hindwings light fuscous; 4 absent; cilia as in forewings.

Recalls *Xysmatodoma saxosa*, Meyr., in general appearance, but the absence of vein 4 of hindwings clearly refer it to *Lepidoscia*.

Stawell, Victoria; one specimen in March.

EUSYNOPA, n. g.

Head rough, palpi porrected, hardly curved, second joint moderate, thickest at apex, terminal joint acute. Antennæ in male four-fifths, thickened. Posterior tibiæ rough haired. Forewings with vein 2 from just before angle of cell; 3 and 4 stalked from angle; 7 and 8 separate, 7 to costa, 9 and 10 stalked; 11 from a point with 10. Hindwings with all veins separate.

Type, *E. chrysogramma*, Low.

Allied to *Scardia*, Tr., but differs from it and the allied genera by the neuration. The genus is formed to receive *chrysogramma*, Low., formerly placed by me in *Scardia*.

SCARDIA XANTHOBAPTA, n. sp.

Male, 12 mm. Head, palpi, and thorax orange-yellow. Antennæ ochreous. Abdomen and legs greyish-ochreous. Forewings elongate, moderate, costa moderately arched, termen strongly oblique; 4 present; yellowish-orange; costa narrowly dark fuscous from base to two-thirds, posterior termination abrupt, edged below at extremity with orange; a narrow waved, curved, silvery-white line from dorsum before anal angle to termen above anal angle, finely edged internally with fuscous, and enclosing a patch of deeper orange; cilia orange, becoming silvery-white at extremity of streak. Hindwings and cilia grey.

Nearest *pyrochroa*, Meyr., but differs in presence of vein 4 of forewings and other details.

Cooktown, Queensland; one specimen, in December.

CHRYSORYCTIS HEMINEPHELA, n. sp.

Female, 16 mm. Head and palpi yellow. Thorax and abdomen dark purplish-fuscous. Antennæ fuscous. Legs purplish-fuscous, posterior pair ochreous. Forewings elongate, moderate, costa gently arched, termen very oblique; pale shining yellow; a narrow purplish streak along costa from base to beyond middle, attenuated posteriorly; a fuscous-purplish spot above anal angle; cilia purplish-fuscous. Hindwings light shining purplish; cilia fuscous, at base ochreous.

Between *talantias*, Meyr., and *ochranthes*, Meyr., differing from both by the anal spot and costal streak not being connected with base.

Broken Hill, New South Wales; one specimen, in November.

CHRYSORYCTIS HEMISEMA, n. sp.

Female, 12 mm. Head and palpi yellow-ochreous. Antennæ thorax, legs, and abdomen dark purplish-fuscous. Forewings elongate, slightly dilated posteriorly, costa gently arched, termen very oblique; shining ochreous-yellow; a short flattened purplish fuscous streak along costa from base to beyond middle, suddenly attenuated on posterior two-thirds, not near reaching innermargin at base; a moderately broad purplish-fuscous band along termen anterior edge, oblique from costa at four-fifths to dorsum at about two-thirds; cilia purplish-fuscous. Hindwings bronzy-ochreous, shining; cilia light bronzy-ochreous.

Allied to *purella*, Walk., but differs especially by the basal mark not reaching dorsum.

Melbourne, Victoria; one specimen, in October.

IPHIERGA POLYZONA, n. sp.

Male, 20 mm. Head and palpi ochreous, palpi tufted. Thorax and abdomen dark fuscous, patagia fuscous. Legs fuscous, posterior pair ochreous. Forewings elongate, moderate, costa gently arched, termen rounded; 4 absent; ochreous with black markings; a narrow basal fascia, four moderate straight transverse fasciæ; first from one-fourth costa to one-fourth dorsum; second from two-thirds costa to two-thirds dorsum; third from just before middle of costa to just before middle of dorsum; fourth parallel to termen, cilia ochreous. Hindwings fuscous; cilia ochreous.

Allied to *melichrysa*, Low., but the extra fascia separates it at once. It also has considerable resemblance to *euphragma*, Meyr., but vein 4 is present in that species.

Stawell, Victoria; one (poor) specimen, in October.

On Eucalyptus Odorata, Behr.

By J. H. Maiden, Government Botanist of N.S.W., and Director of the Botanic Gardens, Sydney.

[Read October 27, 1903.]

This is an interesting species, described from South Australian specimens collected in 1848, and until a year or two ago believed to be endemic to that State.* Since then it has been traced into Victoria and extensively in New South Wales. It is believed to occur in Queensland, and may yet be found in Western Australia. South Australian specimens, described in some cases from imperfect material, give rise to a perplexing number of synonyms which I will set forth. Following is the original description of the species:—

"178. *Eucalyptus odorata*, Behr. Rami elongati ut reliquæ partes glabri, juniores angulati (angulis 2 e basi petiolorum orientibus, altero superiore magis prominente), adulti teretes, cortice e viridi fuscescente. Umbellæ breviter pedunculatæ ex axillis foliorum dejectorum rariusve persistentium anni præteriti prorumpunt, pedunculo ¼-½ poll. longo, flores 6-15 brevissime pedicellatos ferente, pedicellis lineam circiter longis crassis angulatis, sensim in calycis tubum, circ. 2 lin. longum, apice cylindricum, ex toto obconicum abiens, calyptra vix 1½ lin., alta, conica obtusiuscula. Stamina pluriserialia filamentis primum crispulis, dein 1½ lin. longis. Stylus cum stigmate terminali planiusculo nunc calycis margine brevior, nunc ex eo magis minusve emergens. Folia oblonga (cum petiolo 3-4½ poll. longa), leviter inæquilatera vix unquam curvata, basi in petiolum attenuata, apice obtusa et tunc interdum mucronata v. acutiuscula vel in acumen breve producta, glauca concolora, crebre pellucide punctulata, margine leviter incrassato pallidiore, rete vasculoso utrinque (in siccis) prominente, venis primariis nervum juxta marginem procurrentem formantibus, spatio marginem inter et nervum venuloso. Sæpius folia irre-

* Since the above was written I have observed the following:—"*E. odorata*, from imperfect specimens forwarded to me, appears to exist on the Lachlan (N.S.W.)." "A Contribution to the Flora of Australia," W. Woolls, p. 244 (1867).

gulariter lobata apparent, lobulo uno alterove obtusissimo in latere vel apicem versus occurrente.

"Mässiger Baum, an trocknen Stellen un auf leichtem Boden ziemlich allgemein verbreitet. Schwitzt ein Gummi aus, welches wie Gummi Kino gebraucht werden könnte. Seine Blätter strotzen von ätherischem Oele und hauchen einen Geruch aus wenn es regnen will. Der Stamm ist rauh, da er sich nicht viel abschält. (Peppermint der Kolonisten)." (Schlecht. in *Linnæa*. XX., 657.)

Following is a type specimen:—

"*Eucalyptus odorata*, Behr. and Schlecht (sine nom. ex herb., Behr.), Light's Pass, Sandberg, Nov. Holl. Austr., Dr. Ferd. Müller."

An identical specimen is labelled "*Euc. odorata*, var. *erythrostoma*," Light's Pass.

It is one of the specimens labelled "Madam Pepperweath," by Miquel, a mistaken reading by him for "in modum Peppermenth, or *like peppermint*," as pointed out under *E. incrassata* in B. Fl. iii., 231.

The bark is often of that peculiar character known as "Peppermint," though softer than the generality of the barks of the coast Peppermints of Eastern Australia. It is very commonly intermediate in character between that of an Ironbark and a Box, hence the name "Ironbark Box," which is often applied to it in New South Wales, and which is very descriptive.

The timber is hard and remarkably interlocked or curly. It varies in color from brown to reddish brown, and even red. The color tones down with age; timber of the typical form from South Australia which was originally red is now dark brown. I have a series including many shades of color.

I have made an attempt to subdivide the various forms of *E. odorata*, but it is obvious that they run into one another; and, further, the same tree has different kinds of leaves (within limits) according to the season of the year and the part of the tree from which they have been taken. These remarks apply with more or less force to most species of the genus. One form, however, seems worthy of special mention.

Linear-lanceolate leaves, coriaceous, shiny, veins not strongly marked. This is perhaps the form most dissimilar in appearance to the type, and might be called var. *linearis*, var. nov.

It is the prevailing form in the "Whipstick Mallee" of New South Wales and Victoria.

SYNONYMS.

1. *E. calcicultrix*, F. v. M. (*E. odorata*, Behr., var. *calcicultrix*, Miq.).
2. *E. cajuputea*, F. v. M.
3. *E. perforata*, F. v. M.
4. *E. odorata*, Behr., var. *erythrandra*, F. v. M.
5. *E. odorata*, Behr., var. *erythrostoma*, F. v. M.
6. *E. porosa*, Miq.
7. *E. leucoxylon*, F. v. M., var. *pluriflora*, F. v. M.
8. *E. viridis*, R. T. Baker.
9. *E. polybractea*, R. T. Baker.
10. *E. Woollsiana*, R. T. Baker.

1. E. CALCICULTRIX, *F. v. M.*

"var. *calcicultrix*? (*E. calcicultrix*, F. Müll., Herb. et adnot.); foliis tenuioribus elliptico-vel oblongo-lanceolatis extenuato-apiculatis, adspectu subtrinerviis, 2-3¼ poll. longis. Locis calcareis ad Adelaide Nov. Holl. Austr. (F. M.)." (Miq. in *Ned. Kruidk. Arch.*, iv., 129, 1856.)

Following are specimens of the type:—

"13. *Eucalyptus odorata*, Behr., var. *calcicultrix*, Adelaide. Fl. hieme, F. Müller." (Herb. Sonder.)

"*Euc. calcicultrix*, F. M. (*odorata*), Nr. Adelaide." (Herb. Melb.)

This is the common Adelaide scrub form of *E. odorata*, sometimes known as "Black Mallee." "Of a dull and bluish type of green and fairly erect in its general growth" (W. Gill). Leaves narrow, fruits in heads.

"Peppermint," Adelaide (R. H. Cambage).

2. E. CAJUPUTEA, *F. v. M.*

"7. *Euc. cajuputea*, Ferd. Müll., Herb. ramulis tenuibus superne acutangulis, foliis linearibus apice acuminate vulgo sphacelatis, basi in petiolum brevem tortum attenuatis ut plurimum falcatis, coriaceis, costa tenui subtusparumper prominente, venis adscendentibus obtectis, una utrinque e basi subdistincta, umbellis axillaribus et lateralibus, 3-7-vulgo 5 floris, floribus breviter pedicellatis, operculo conico non mucronato calycis tubum obconicum fere æquante.

"*Flinders Range* (F. Müller).

"Petioli circiter 3 lin., folia 2½-4½ poll. longa, 2-4 vulgo 3 lin. lata. Pedunculi 2-3 lin. longi; pedicelli 1-1½ lin. longa, ancipites vel tetraquetri. Calycis tubus 1½-2 lin. quandoque subanceps." (Miq. in *Ned. Kruidk. Arch.*, iv., 126, 1856).

I have a specimen of the type, and it is normal *E. odorata*.

3. E. PERFORATA, *F. v. M.*

"13. *Eucalyptus odorata*, Behr., in *Linnæa*, xx., p. 657, n. 178. *E. perforata*, Ferd. Müll., Herb. olim. Dombey Bay, forma angustifol. frutex 5-8-pedalis as aquas stagnantes ad fl. Murray passim crebro; in terra calcarea undulata prope Adelaide (F.M.); ad Light's Pass et Sandberg (Behr.).

"Cortex ramorum juniorum interdum nigrescit; pedicelli pedunculique plus minus angulati rugulosi, filamenta denique 2 longa." F. Müll. (Miq. in *Ned. Kruidk. Arch.*, iv., 129).

4. E. ODORATA, BEHR., VAR. ERYTHRANDRA, *F. v. M.*

"var. *erythrandra*, Ferd. Müll., filamentis rubris, foliis latioribus, habiter robustiore.

"*Port Lincoln* Novæ Holl. austr. frutex 5-6-pedalis (F. Müller)." (Miq. *Ned. Kruidk.*, &c.)

Following are type specimens:—

"13. *E. odorata*, Behr., var. *erythrandra*, F. v. M. Murray, Dr. Behr." Copy of label in Herb. Sonder.

"*E. odorata* var. *erythrandra*, Ferd. M. (*E. perforata*, mihi aut.), Port Lincoln, Ferd. Müll." Copy of label in Herb., Melb.

Both of these specimens are *E. odorata*.

5. E. ODORATA, BEHR., VAR. ERYTHROSTOMA, *F. v. M.* (ANTE. P. 241).

6. E. POROSA, MIQ.

"19. *Eucalyptus porosa*, Ferd. Müll., ramulis tenuibus teretibus superne saltem leviter angulatis, foliis longuiscule petiolatis e basi acutâ subæquali lanceloatis vulgo falcatis attenuato-acuminatis coriaceis glanduloso-perforatis nitidulis, venis patule adscendentibus prominentibus tenere reticulatis ante marginem unitis, pedunculis axillaribus et lateralibus petiolo duplo brevioribus 4-6-floris, floribus subsessilibus, calycis tubo viridi obconico-obovato operculum conico-semiglobosum lutescens æquante vel subsuperante.

"In monte Kaisersstuhl Novæ Holl. austr., ab æstate ad autumnum florens, Flinders Range, *F. M.*

"*Euc. strictæ*, Sieb. affinis. Petioli ½-fere 1 poll. longi. Folia 3-4 poll. longa. Pedunculi 2 lin., alabastra operculata circiter æquantes. Foliorum venis valde distinctis ab *E. santalifolia*, cui cæteroquin haud absimilis, differt." (Miq. in *Ned. Kruidk. Arch.*, iv., 132).

Types of both are in Herb., Melb., and are *E. odorata*.

7. E. LEUCOXYLON, *F. v. M.*, VAR. PLURIFLORA, F.M.

"Umbellis plerumque 5-floris, pedicellis abbreviatis. *E. odorata*? Behr., Herb., non in Linnæa. Ad Gawler-town." (Miq. in *Ned. Fruidk. Arch.*, iv.).

This is *E. odorata*, Behr.

Following is a copy of Allan Cunningham's Journal (Oxley's Expedition) on the Lachlan River, under date 23rd May, 1817:—"Eucalyptus acacioides. A shrub about 12 feet high, allied to *E. saligna*."

I have received a specimen in flower from Herb., Kew. There is a fruiting specimen in Herb. Cant. In the absence of fruit its superficial resemblance to *E. stricta*, Sieb., var. *angustifolia*, Benth., is remarkable.

Cunningham confused his own plant with another. There is a specimen of *E. stricta*, Sieb., in Herb. Vindob., bearing the following label in Allan Cunningham's handwriting:—"Eucalyptus acacioides, C., Mar., 1817, Blue Mountains, N.S.W., 1817 (?), one of Sieber's species" (which, indeed, it really is).

8. E. VIRIDIS, R. T. BAKER., PROC. LINN. SOC., N.S.W., XXV., 316 (1900).

"Green Mallee, Red Mallee, Brown Mallee."

Type localities: On the hills near Girilambone, N.S.W., thence across country to Cobar; also 7 miles out from Coolabah, on the Wilga Downs-road."

9. E. POLYBRACTEA, R. T. BAKER, PROC. LINN. SOC., N.S.W., XXV., 692 (1900).

"Blue Mallee." Locality for type, West Wyalong, N.S.W.

10. E. WOOLLSIANA, R. T. BAKER.
Proc. Linn. Soc., N.S.W., xxv., 684.)

The following specimens appear to be referable to *E. Woollsiana*, R. T. Baker, which appears to me to be not specifically different from *E. odorata*. Mr. R. H. Cambage (*Proc. Linn. Soc.*, N.S.W., xxvi., 321) has pointed out the resemblance.

Further enquiry will, I think, bring to light many additional localities, for one form or another of the species, and for the present I confine myself to naming one variety, *linearis* (ante. p. 241), though it may be convenient to enumerate one or two others later on, including, perhaps, the very small fruited form.

E. Woollsiana has the numerous fine oil-dots of *E. odorata*, a

character it shares with *E. hemiphloia*, var. *microcarpa*, Maiden. The inclusion of *E. Woollsiana* in this variety (*Trans. R.S., S.A.*, 1902, p. 11) is perhaps erroneous. Certainly it is very close to *hemiphloia* var. *microcarpa*, and some botanists may consider it to be nearer to that species than to *E. odorata*, New South Wales.

1. "Mallee Box." Has a thin, tall trunk with a Box bark, ribbony at the branches, which issue at a good height from the ground. It grows amongst other Mallees in dry, stony situations. Mount Boppy, near Cobar (J. L. Boorman). Has very small fruits.

2. Girilambone to Condobolin (W. Baeuerlen), suckers of moderate width, broader than those of Narrabri (No. 10).

3. Condobolin (W. Baeuerlen), with coarser foliage and fruits than described, but with specimens typical for *E. Woollsiana*, R. T. Baker.

3A. A specimen of the timber of *E. Woollsiana* from Nyngan, sent to me by Mr. Baker, is identical with that of *E. odorata*, grown in South Australia.

4. "Coolibah," Murrumbidgerie, G. W. Railway (A. Murphy). The timber is almost as brown as No. 3A, or perhaps a shade redder.

5. "White Box." Forbes to Eugowra (R. H. Cambage).

6. "Narrow leaved Box." On the plains near Baradine (W. Forsyth).

7. "Large scrub or small tree," 18 miles from Dubbo (W. Forsyth).

8. "Box." Minore (J. L. Boorman).

9. Castlereagh River (Rev. Dr. Woolls) labelled "E. largiflorens," by Mueller.

10. "Box," Narrabri, where it is common (J. H. Maiden). Narrow lanceolate suckers.

11. "Narrow leaved Box," Moree (W. S. Campbell).

AFFINITIES.

(*a*) With *E. bicolor*, A. Cunn.

I am of opinion that *E. odorata* is closely related to *E. bicolor*, so much so that in districts far removed from the type of either they run into one another and partake of the characters of both. This is the case with Queensland specimens in particular. Some of the narrow-leaved small fruited forms of *odorata* resemble those of *E. bicolor* a good deal, but can usually be distinguished by the bright sap green of the former and the dull green, almost greenish white, of the latter. *E. odorata* has a hard scaly or Peppermint bark, that of *E.*

bicolor is usually more fibrous, although often enough the difference is but slight.

Mueller (Eucalyptographia) under *largiflorens*, says:—*E. odorata* is distinguished by

1. The generally broader leaves.
2. Simple axillary umbels.
3. More elongated calyces tapering rather more gradually into the stalklets.
4. By longer buds.
5. Larger anthers.
6. Longer fruits not contracted at the orifice.

I would say that, as a rule, *bicolor* has shorter filaments, blunter opercula and subcylindrical or ovoid fruits in contradistinction to the large hemispherical fruits of *odorata*. It prefers drier situations to *E. bicolor*.

The "Cooburn or Black Box" is a tree that is often placed under *E. bicolor*, but in my opinion its place is with *odorata*.

"Cooburn, Black Box; Ironbark Box, Bastard Ironbark."

This tree is referred to in the following passage:—"Cooburn, Black Box (*Euc. largiflorens*). Timber hard, tough, and durable; very lasting underground, of a red color. Used for fencing, rough buildings, and sleepers. Hab., stony ridges, scrub forests, N. & S. coast districts (*sic*). 100-120' 2-3'. Not very plentiful. N.S.W. Catal. Col. and Ind. Exh., p. 199.)

It has a hard, scaly black bark.

It is referred to by Mr. R. H. Cambage (*Proceedings Linn. Soc., N.S.W.*, 1900, 716) when discussing hybridization.

It appears to be the "Ironbark Box or Bastard Ironbark" of Condobolin (R. H. Cambage); the Ironbark Box or Bastard Ironbark of Nymagee (R. H. Cambage); the Cooburn or Black Box of Narrabri (Forester McGee). It is a tree which requires further investigation, the first work to be undertaken being a list of localities which produce timbers known as "Ironbark Box" or "Bastard Ironbark."

(*b*) With *E. melliodora*, A. Cunn.

The figure (Suppl. pl. xvii.) Mueller's "Plants of the Colony of Victoria," labelled *E. odorata*, Behr. & Schlecht, is, in my opinion, *E. melliodora*, A. Cunn. The affinity of this species to *E. melliodora* has already been pointed out in the "Eucalyptographia." *E. melliodora* is sharply separated by its drooping habit and pale colored wood; the thickened rim round the ripening edge of the fruit is common in *melliodora*, though far more seldom seen in *odorata*.

(*c*) With *E. leucoxylon*, F. v. M.

E. odorata may be readily confused with *E. leucoxylon* as

regards the small fruited forms of the latter. For example, Mueller's variety *pluriflora* of the latter is *odorata*. The timber of *E. leucoxylon* is pale, and its bark less rough. The venation of the leaves of *E. odorata* is more marked than that of *E. leucoxylon*.

(*d*) With *E. fœcunda*, Schauer.

The affinity of these two species as regards foliage buds, fruits, and perhaps timber is undoubted. *E. loxophleba*, Benth., var. *fruticosa*, Benth., B. Fl. iii., 252, is, in my opinion, referable to *E. odorata* (*E. loxophleba* is now acknowledged to be a form of *E. fœcunda*). *E. odorata* has not yet been traced to Western Australia, and the relations of the two species require to be more closely studied.

(*e*) With *E. hemiphloia*, F. v. M.

Brown, in his "Forest Flora of South Australia," says that *E. odorata* is allied to *E. hemiphloia* in that State. This is doubtless true in other States also, and should be borne in mind. For some further remarks touching the affinity of *E. odorata* to *E. hemiphloia*, var. *microcarpa*, see under *E. Woolsiana*, p. 244. Mr. R. H. Cambage, *Proc. Linn. Soc., N.S.W.*, xxv., 714, has drawn attention to the similarity of the two species.

(*f*) With *E. calycogona*, Turcz.

The form of *odorata*, known as var. *linearis*, and called "Whipstick Mallee" in New South Wales and Victoria, undoubtedly presents similarity to *E. calycogona*, Turcz., var *gracilis*, Maiden. A very ready difference between them lies in the pointed opercula of *E. odorata*. *E. calycogona*, Turcz., var. *celastroides*, Maiden, in its narrowed-leaved forms, displays similarity in leaves, glaucousness, and shape of buds. The fruits, however, are ovoid, while those of *odorata* are hemispherical.

RANGE.

South Australia.

"No. 178. Eucalyptus odorata, Sud Australie, Dr. Behr., 1848." (Herb. Barbey-Boissier). A type specimen.

Kangaroo Island (J. G. O. Tepper), with rather broad leaves.

Following are specimens of *E. odorata* collected by Wilhelmi at Dombey Bay:—

"No. 13. *Eucal. odorata*, Behr., Dombey Bay," in Herb. Sond.

"*Euc. odorata* forma angustifolia, Dombey Bay, December, 1851." The leaves seem to me of normal width. (Probably *E. perforata*, F. v. M.).

"Box," Serviceton, March, 1901 (R. H. Cambage).

Wimmera district, Oct., 1900, with shiny leaves (C. Walter).

Whip Stick Gum; covers a large tract of country north of Bendigo (W. W. Froggatt, July, 1892).

"Mallee," Eaglehawk Flagstaff (A. W. Howitt), August, 1891.

"Mallee," Rushworth (A. W. Howitt).

All these specimens with narrow leaves, and belong to the new variety I propose to call *linearis*. Such specimens were at one time called *E. gracilis*.

"Mallee," Rushworth (A. W. Howitt) (128).

"Mallee," St. Arnaud (A. W. Howitt) (126).

These specimens have a bluish, glaucous cast, and resemble those of *E. fruticetorum*, F. v. M. (*E. calycogona*, Turcz., var. *celastroides*, Maiden) a good deal, but the fruits of the *odorata* specimens are more hemispherical.

NEW SOUTH WALES.

The following note was sent by the late K. H. Bennett, of Ivanhoe, via Hay, with a twig that I refer to *E. odorata*. It is a useful general description of Mallee in this State:—

"This is our most common tree, having a very wide distribution, and frequently covering large areas of country with an almost impenetrable scrub which is either entirely destitute of undergrowth or vegetation of any kind, and the ground thickly covered with nodules of limestone; or else produces a dense growth of spinifex, better known as porcupine grass, which, when freshly springing after it has been burnt, cattle are as fond of it as they are also of the grain or seeds. These scrubs are habitat of that singular bird, the Lowan, or Mallee hen. When growing in dense masses, this tree rarely exceeds 12 to 14 feet in height; but individual trees on the outskirts of the scrub are often found to be quite 30 ft. high. The straight lance-like stems of those growing in masses are very useful in the construction of gates and hurdles, as the wood is remarkably tough. The natives obtain water from its roots."

Euc. acacioides, A. Cunn, Mss. "New Holland., A. Cunningham, Hooker, 1835." Herb., Kew, Lachlan River. From several herbaria.

"Box Mallee of the Western districts." H. Deane (Dec., 1892).

Ironbark Box, Condobolin (R. H. Cambage).

Mallee, Condobolin, Forester Kidston (Sept., 1894).

The Lachlan, Miss Clements.

These are two specimens belonging to var. *linearis*. Wyalong, "Willowy, light-colored stems" (W. S. Campbell). Mallee, Wyalong (Forester J. G. Postlewaite, March, 1900). Bluish, glaucous cast, narrow leaves, very similar to *E. fruticetorum*, but with hemispherical fruits.

Blue Mallee, Wyalong (R. H. Cambage), September, 1900. Type of *E. polybractea*, R. T. B., kindly supplied by Mr. Baker. Identical with South Australian specimens.

White Ironbark or Ironbark Box. No. 1. Barmedman (R. H. Cambage). "Bark rather yellow, smoother than Ironbark; rougher than Box. Growing near *E. sideroxylon*. This particular tree showed more like Ironbark than usual." The fruits have a rim, and those of South Australian *E. odorata* often have such a rim. The foliage is dull like that of some Wyalong specimens referred by me to *E. odorata*.

"Known as Whipstick Mallee from its erect, slender stems. Its fruits are generally small, but vary in size very much. The bark is brown at the base and white above. This is the most easily distinguished of all the Mallees owing to its narrow green leaves. In some cases it grows as a single tree 50 feet high and a foot in diameter" (R. H. Cambage). (*Proc. Linn. Soc., N.S.W.*, 1900, p. 602.)

Cobar (W. Woolls).

Nymagee (J. Wharton Cox).

Ironbark Box or Bastard Ironbark, Trowell Creek, Nymagee (R. H. Cambage).

Girilambone (E. Betche, October, 1886).

Green Mallee. Type of *E. viridis*, R. T. Baker. Girilambone, Jan., 1900 (W. Bauerlen).

"Plentiful around the hills of Girilambone. Small thin stems, ribbony at base, white at tips" (J. L. Boorman, June, 1901).

Nyngan (Forester G. Martin).

"Mallee Box," Minore. "Trees on Ironstone ridges in company with Mallee. Tall trees, 6 in. to 1 ft. in diameter, with grey, box-like bark, branches clean. Sap-wood pale, centre red, leaves long, pendulous, hence sometimes known as long leaf Box" (J. L. Boorman). Typical for *E. odorata*.

"Bastard Ironbark or Bastard Box. A very tall and straight tree, growing amongst *E. crebra*, but has quite a different appearance. Is sometimes used as a substitute for Ironbark; is only found in ones and twos; rare in the Dubbo district" (J. L. Boorman). Small fruits, transit to *E. bicolor*.

"Black Box or Cooburn," Narrabri district. In bud only (Forester McGee).

QUEENSLAND.

Mount Elliott, Fitzalan. "Eucalytpus (Leiophloiæ), placed by Bentham with *E. largiflorens*, seemingly with injustice" (Mueller in Herb., Melb.). This is one of the forms which, in my opinion, undoubtly shows transit to *E. odorata*.

Ravenswood, Burdekin River (S. Johnson).

Similar to preceding. Leaves, buds, and flowers only are available in both cases; the pointed opercula, and more prominent veins to the more shiny leaves point to *E. odorata*, with which, not without doubt, I place it for the present.

NOTES ON LORANTHUS EXOCARPI.

By C. F. JOHNCOCK.

[Read September 8, 1903.]

These notes may be taken as a continuation of those offered in my paper of November 5, 1901, except that they are the result of observations carried on in another district.

The number of different kinds of trees serving as host-plants in the vicinity of Morphett Vale is rather surprising, as the following list will show. By independent observation and by enquiry I have, up to the time of writing, been able to examine growths on the undermentioned trees :—

a. NATIVE TREES.—*Casuarina quadrivalvis* (sheaoak), *Acacia salicina*, *Eucalyptus rostrata* (red gum), *Santalum acuminatum* (wild peach), *Exocarpus cupressiformis* (native cherry), *Callitris cupressiformis* (cypress pine).

b. EXOTICS.—Apple, almond, pear, quince, oleander, lemon, olive, fig.

With regard to the specimen found on the lemon-tree, I was struck with the fact that the petals were no longer red, with green tips, but bright lemon-yellow, with green tips. Whether this change in colour is accidental, or induced by the nature of the nutrient material derived from the host I am in no way prepared to say at present. I hope, however, to give the question attention next season.

The greater part of the growths I found occur on *C. quadrivalvis*. This must be on account of the excellent opportunity offered for the germination of the seed in the most favourable situation. The bark of the tree being characteristically rough, it naturally follows that any seed deposited on its branches is not likely to be displaced again. Second in order of infection comes *E. cupressiformis*, another rough-barked tree. The other cases are, so far, unique in my experience.

In the same paper I also said concerning the wattle bird—" I hope to be able shortly to establish proof " of its being a means of distributing seeds . . ." That proof I have since obtained. Several birds, shot in different places in the Willochra district, contained seeds in their digestive apparatus ; and I have more than once observed *Acanthochaera carunculata* picking the berries in this locality.

Dicaeum hirundinaceum I have very rarely seen, but I have seen it eating the berries also. It is to neither of these birds, however, that I ascribe the work of distributing the seeds. A far more important part is played by the Silver-eye—*Zosterops cerulescens*. This bird frequents small, thickish trees, and *Casuarina* is just the kind of tree to this bird's taste. Seeing, therefore, that the seeds are part of its winter food, and the tree a favourite shelter, it appears pretty certain that the despised Silver-eye is the chief agent in the dissemination of the particular *Loranthus* under consideration.

Another bird which must be regarded as a distributor is *Grauculus melanops*, a winter visitant to this district. When insects become scarce, a mixed diet is resorted to. I have on many occasions watched *Grauculus* hovering over the African box-thorn bushes in the hedges, picking off the ripe berries. The fruit of *Loranthus* is also acceptable, and readily eaten. Being rather weak of flight, a little hovering seems to tire the bird, and it then flies to a perch on the top of some neighbouring tree. Where the *Casuarinæ* grow plentifully, *Grauculus* must of necessity deposit many seeds as it perches on the tree-tops between its swoops at the *Loranthus* clusters.

Have we not now a pretty satisfactory explanation of the attachment of *L. exocarpi* to the *Casuarinæ* in the habits above described of the two birds *Zosterops* and *Grauculus?* Probably in the case of *Zosterops* there has grown up a certain amount of interdependency—the tree sheltering and affording food to the bird, and the bird in its turn securing the spread of the mistletoe. To *Zosterops* also must be credited the occurrence of the parasite on the fruit trees, as the Silver-eye is a notorious fruit-eater and frequenter of orchards all the year round. I would hint again at the perhaps small part played by *Acanthiza*, which nests in the mistletoe clumps at the end of winter, and so may often carry seeds sticking to its feathers, &c , as indeed all the birds mentioned above are almost certain to do. The questions involved by the consideration of the exact modes of distribution of these birds are beyond the scope of this paper. I propose to deal with that point in a future contribution.

Discussion.

Mr. J. G O. Tepper doubted whether *L. exocarpi* occurred on garden fruit-trees, as stated by the author. The only well-authenticated instance of a *Loranthus* species being abundantly parasitic on any kinds of fruit-trees are those recorded from Victoria, &c., of *L. celastroides*. The view that birds which feed on the berries of *Loranthus* are the principal agents in their distribution he regarded as untenable, as also the assumption

upon which it is based that the *Loranthus* can only germinate after passing through the digestive organs of birds. Experience has shown that they will germinate freely when fixed by the pulp to a suitable spot on a branch of one of its natural hosts. An important consideration is that by the passage of the seeds through the body of the bird they become deprived of their adhesiveness, which would imply that the latter quality was unnecessary for the dissemination of the species.

Mr. SAMUEL DIXON corroborated the statement of the author as to the occurrence of *Loranthus* on fruit trees, he having seen several of these parasitic plants flourishing on a Turkey fig, without any apparent detriment to the tree. With respect to the propagation of the plant by bird droppings, he would like the author to obtain corroborative evidences of such.

The AUTHOR, in reply, stated that he had made his determination of the *Loranthus* growths, or the trees mentioned, with the greatest care, closely examining both the flowers and the foliage, and was confident of the certainty of his results. He made no attempt in his papers to define exactly the part played by the birds mentioned, or others, in the distribution of the seeds, but he wished to emphasise the fact of their distribution by such agents.

THE PORT VICTOR GRANITE.*

By H. W. GARTRELL.

[Communicated by W. G. WOOLNOUGH, B.Sc., F.G.S.]

[Read October 27, 1903.]

The granite outcrops at Port Elliot, Port Victor, and Rosetta Head form a part of the northern edge of the extensive granitoid belt which follows the eastern side of the Mount Lofty Ranges, and skirts the southern side of Kangaroo Island. The granite is intrusive, and is seen at the places mentioned and elsewhere to penetrate mica schists or other highly metamorphosed rocks.

The rocks in question possess considerable interest in their comparative study with other outcrops in this vast granitic area as well as from the light they may throw on the lines of distribution which have been followed by the glacial erratics of the older and newer glacial periods of South Australia.

This paper contains the results of a careful examination of the large porphyritic felspars of the rock.

PREPARATION OF THE MATERIAL.

Crystals were broken from the rock and freed from adherent quartz. These were then broken into small fragments in a steel die. All flakes of mica and fine dust were rejected and the fragments each carefully examined to eliminate any fragments of quartz. Large fragments were further broken to prevent inclusions of mica and no fragments accepted with a greater dimension than one-eighth of an inch. The granules were then pulverised in the steel die and the powder finely ground in an agate mortar. The powder was used in an air dried condition.

CHEMICAL ANALYSIS OF THE FELSPAR.

At first ·75 gramme was taken for the determination of silica and bases in anticipation of small quantities of lime and magnesia, but this was found unwieldy and about ·5 gramme taken. The fused mass showed a faint greenish tinge due to a trace of manganese. The silica was then estimated by the method recommended by Hillebrand, i.e. evaporating to dryness, filtering and

*An Abridged Reprint of the Essay which obtained the Tate Memorial Medal, 1903.

re-evaporating the filtrate. In one case only was the alumina precipitate stained (by iron), the amount present was, however, far too small to estimate volumetrically.

The amount of magnesia obtained was unweighable.

THE ALKALIS.

Two methods were used.

(1) *That of Lawrence Smith.*—About half a gramme of rock was used. A difficulty was here met with as the mass was found to have fused in places to the sides of the tube. On repeating the same difficulty was met. A lower temperature was then tried, and the mass came out readily. This, however, gave a low alkali content. The other method tried was to increase the lime proportion. With twelve parts of calcium carbonate instead of eight the mass came out readily from the crucible.

(2) *Estimation of Alkalis by the Hydrofluoric Acid Method.*—Fearing that the large percentage of potash might give rise to loss through volatilization in the original fusion, and also as a check, this method was used. It gave exactly the same result as the first method for potassium, but a slightly higher value for sodium.

	I.	II.	Mean.	Corrected for Moisture.	Molecular Proportions.
SiO_2	64 67	64·40	64·54	64·93	1·0782
Al_2O_3	19·24	19·43	19·34	19·45	·1908
Fe_2O_3	trace	trace	—	—	—
MnO	trace	trace	—	—	—
MgO	trace	trace	—	—	—
CaO	1·22	1·26	1·24	1·24	·0221
Na_2O	2·91	2·86	2 88	2·89	·0466
K_2O	11·86	11·82	11·84	11·91	·1266
H_2O on ignition	·58	·58	·58	—	—
Total ...	100·48	100·35	100·42	100·41	—

Working out the silica and alumina equivalents for lime and alkalis we get 1·0834 and ·1953 respectively. These numbers are equivalent to an excess of ·31 per cent. of SiO_2 and ·46 per cent. Al_2O_3 over the amounts found by analysis. The error is more probably in the lime and alkalis, particularly the latter, as there were not sufficient platinum utensils to carry out all the operations in platinum.

The formula of the felspar is thus—

$$Or_{23}\ Ab_8\ An_4, \text{ or nearly } Or_6\ Ab_2\ An_1$$

and its chemical properties place it in the *Anorthoclase group.*

The results of chemical analysis were checked, as far as possible, by measurements of the physical and optical properties, with very concordant results.

Crystallographic Measurements.*

These measurements of the angle between the (001) and (010) cleavages were made by means of a Miers' goniometer reading to one minute. The cleavage flakes give fair to good images. The maximum value obtained was 89° 56′, the minimum 89° 45′ with an average of 89° 53′ for nine readings.

Optical Measurement.—No diamonds being available for sectioning, this part of the work was postponed as long as possible in the hope of their arrival. When this was finally despaired of and the work commenced everything had to be done in a short time. Small fragments of the felspar were broken off and pieces with two good cleavages selected. These were then broken parallel to one cleavage and the two parts ground down on different cleavages and mounted. No oriented sections other than these could be cut. The extinction angles were carefully measured. No instrument was available for the measuring of the axial angle. The sections were examined under convergent light with a Swift's ⅛″ NA 0·97 objective.

Most of the sections exhibit excessively fine multiple twinning. Those parallel to (001) show striations after both albite and pericline laws, those parallel to (010) exhibit pericline lamellæ only. The fineness of the lamellæ, sinking to submicroscopic dimensions, makes optical measurements very difficult. As the mean of a large number of readings the following results were obtained :—

Extinction on basal plane, measured from the trace of (010), varies from 2° to 5°. Extinction on (010), measured from the trace of (001) is 8° in the positive sense. Sections parallel to (010) give a well defined figure in convergent light, practically centrally situated in the field of the microscope the optical sign is negative. Dispersion is noticeable, $\rho > v$.

Specific gravity of the Felspar.

(1) *By means of Klein's solution*—The indicators used were Goldschmidt's Natural Indicators by F. Krantz of Bonn. The particles were found to nearly coincide in density with cordierite 2·579, some were a little lighter and some a little heavier, but none reaching the next values 2·566 and 2.591. The density might therefore be taken as 2·58.

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*The phenocrysts of felspar are fairly idiomorphic, but it is difficult to obtain isolated crystals sufficiently perfect for external measurements.—W. G. W.

(2) *By the Specific Gravity bottle.*

Results	2·579	Mean.	2·582
	2·584		—

REFRACTIVE INDICES OF THE FELSPAR.

No refractometer being available indirect methods were used and approximate results obtained.

The presence of the acid oligoclase furnished an easy and accurate qualitative test, by employing Becke's bright line method.

The felspar under consideration was found to have a lower index than that of the oligoclase

For ordinary differences, however, this gives no idea of the amount of difference, but we may say that the values are less than the following:—

1·542	1·538	1·532	Oligoclase	Levy.

For exact determinations the principle was extended. Although the amount of movement cannot be taken as a basis of calculation in such an experiment, if we obtain two substances which give no movement, we may assume that they are of the same refractive index.

Two sections were then taken, one parallel to (001) and one to (010), and a portion of the cover-glass removed from each. The balsam was then removed, first by turpentine and then by alcohol. A drop of Klein's solution was placed in contact with the mineral, and Becke's method applied, retaining the polariser, and placing the section with its directions of vibration successively parallel to the principal plane of the polariser.

The solutions employed were, by trial and error, adjusted so that their refractive indices were identical with those of the mineral in its different positions.

In this way four solutions were obtained. The refractive indices of these were measured by means of a spectrometer. Great difficulty was experienced in making these measurements on account of the very strong absorptive power of the liquid. Sodium, potassium, and strontium lights were tried, but of these only potassium gave any results at all. Then the lights from incandescent gases—hydrogen, nitrogen, oxygen, helium, and argon and chlorine—were experimented with with small success. Finally the illumination was obtained by means of an electric spark between terminals composed of an alloy consisting of zinc, cadmium, mercury, and tin in molecular proportions, prepared by Sir William Crookes.

In this way the minimum refractive index (α approximately) is found to be 1·513; the maximum (γ approximately) 1·525, but from the difficulties of measurement the results are only roughly correct.

Summary of the Properties of the Large Porphyritic Crystals of Anorthoclase.

Colour—Flesh pink, subtranslucent to opaque.

Crystalline form—Not determined.

Cleavage—Perfect parallel to (001) and (010), the cleavage angle being 90° 7′.

Polysynthetic twinning after albite and pericline laws on a very fine scale. Twinning after Carlsbad law frequent.

Specific gravity—2·582.

Refractive index between 1·513 and 1·525.

Dispersion—$\rho > v$.

Composition—$Or_{23}\ Ab_8\ An_4$.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 27, 1903.]

XXXIII.

CARABIDÆ.*

PHORTICOSOMUS.

P. calcaratus, sp. nov. Piceo-brunneus, elytris postice et pronoto anguste testaceo-marginatis; capite permagno, sparsim obsolete punctulato, utrinque inter oculos impresso, sutura clypeali profunde sulcata; prothorace quam longiori fere duplo latiori; postice quam antice vix angustiori, leviter canaliculato, latitudine majori paullo ante medium sita, lateribus sat anguste reflexis fortiter arcuatis ante basin sinuatis, angulis posticis sat acute rectis anticis sat rotundatis sat prominentibus; elytris fortiter striatis, interstitiis leviter convexis (3° pone medium punctura setifera instructo); tibiis anticis ad apicem processu magno acuto extus armato et supra hunc denticulis 5 parvis; tibiis posterioribus 4 extus denticulis circiter 8 instructis et ad apicem dilatatis. Long., 6½ l.; lat., 2½ l.

Remarkable by the strongly defined external sculpture of its tibiæ. *P. Horni*, Sloane, has an apical external process on the front tibiæ, but in that species it is shorter and blunter and the denticulations above it are very much smaller; no other *Phorticosomus* known to me has a similar tibial structure. In other respects this species resembles the insect that Mr. Sloane agrees with me in regarding as *P. grandis*, Cast., but has a considerably more strongly transverse prothorax, that segment being scarcely less (by measurement) than twice as wide as long.

Tropical Queensland; taken by Mr. T. W. G. Blackburn.

LOXANDRUS.

L. micantior, sp. nov. Modice elongatus, postice nonnihil dilatatus; minus depressus; niger, certo adspectu violaceo-iridescens, tibiis antennisque picescentibus, palpis tarsisque ferrugineis; oculis modice convexis; prothorace quam longiori circiter ut 5 ad 4 latiori, antice quam trans basin multo angustiori, longitudinaliter canaliculato, postice

fortiter minus crebre punctulato, utrinque ad basin sulco elongato longitudinali impresso, antice leviter emarginato, angulis posticis obtusis, latitudine majori vix ante medium sita, lateribus sat arcuatis anguste (postice magis late) reflexis; elytris fortiter striatis, striis crenulatis, stria abbreviata scutellari nulla, interstitiis sat anguste sat fortiter convexis (3° ante medium punctura instructo). Long., 4 l.; lat., 1½ l.

Differs from all other Australian *Loxandri* known to me or which I can ascertain to have been described, by the evident reflexed margin of its pronotum (the furrow of which is somewhat rugulose) and by the strong puncturation across the base of that segment. *Feronia* (*Pœcilus*) *rufilabris*, Cast., seems to be a *Loxandrus*, and is said to have its prothorax "punctated" behind, but the prothorax of that species is said to be broader in front than behind, and there is no indication of any unusual character in the lateral margin.

N. Queensland.

NITIDULIDÆ.

OMOSITA.

O. discoidea, Er. I have before me specimens of this insect taken in Tasmania by Mr. Griffith. I believe it has not been hitherto recorded as Australian.

LAMELLICORNES.

COPTODACTYLA.

C. glabricollis, Hope. This name was associated by its autho- with a very brief description of a specimen (which was evidently a female) from Port Essington, on the north coast of Australia. Harold (Ann. Mus. Gen., 1877, p. 39) furnishes a full description of both sexes of a species which he considers to be that of Hope. It is unfortunate that he states neither the ground of his identification nor the locality where his specimens were taken. It is to be noted that the size he attributes to the insect (15-16 mm.) is much greater than that quoted by Hope (5 l.). I believe, however, that the identification is correct. I have before me a long series of specimens of *Coptodactyla* from various localities in Northern Australia (including some from near the original locality) which I regard as appertaining to one very variable species; and among them are some certainly identical with those described by Harold. None of these examples, however, are quite so small as Hope's measurements, or quite so large as Harold's. They vary in color from red-brown to deep black; in size from 5½ l. to 7½ l., and also very greatly in the development of the frontal horn in the male, which in some

examples is represented only by a scarcely elevated and very short transverse carina and in successive developments becomes a well elevated carina, then a carina so much elevated as to be a strong tubercle, then a short horn, and eventually a fairly long horn. After careful examination of this series I cannot find any character to rely upon for regarding these forms as representing more than one species—the sculpture of the surface (*e.g.*) being identical in them all and agreeing with Harold's description. I notice that the males differ from the females in the very evidently less transverse form of their pygidium.

C. ducalis, sp. nov. Fem. Oblonga; sat convexa; nitida; nigra; antennis ferrugineis; capite antice undulatim ruguloso, postice sat manifeste punctulato, clypeo antice obtuse bidentato; pronoto in disco vix manifeste (angulos anticos versus subfortiter) punctulato, puncturis sat magnis prope marginem basalem impresso, stria marginali trans apicem continua, carina sublaterali a fovea sublaterali oblique ad marginem lateralem ut *C. glabricollis*, Hope, producta; elytris sat profunde striatis, striis obsolete punctulatis (8ª antice abbreviata, 9ª ante medium cum margine laterali confusa); pygidio convexo lævi. Long., 8½ l.; lat., 4½ l.

Larger than any of the three previously described Australian species. Differs *inter alia* from *glabricollis*, Hope, by the very much finer puncturation of its elytral striæ; from *Baileyi*, Blackb., by the emarginate front margin of its clypeus; and from *subœnea*, Harold, by its non-metallic elytra, and by its pronotum punctured like that of *glabricollis*, and having the marginal stria continuous across its front (as in *glabricollis*).

N. Queensland (Mr. Cowley).

ONTHOPHAGUS.

Australian species of this cosmopolitan and extremely plentiful genus have been described under 105 names. Fourteen of them have been set aside (and stand so in Masters' Catalogue) as synonyms, but two of those fourteen (*desectus*, Macl., and *inermis*, Macl.) I believe to be good species, as indicated more particularly below, the rest (so far as I have means of judging) being rightly treated by Masters. There are, however, nine names treated by Masters as valid (or published at a later date than that of his Catalogue) (viz., *quinquetuberculatus*, Macl.; *Schmeltzi*, Har.; *devexus*, Macl.; *discolor*, Hope; *decurio*, Lansb.; *promptus*, Har.; *patruelis*, Har.; *Duboulayi*, Waterh.; and *hostilis*, Har.) which appear to me to be more or less certainly synonyms and on which notes will be found below. I also suspect,—but am less confident,—that *propinquus*, Macl.;

ntegriceps, Macl., and *humeralis*, Macl., are synonyms. These also are discussed below. Consequently of the 105 names under which Australian *Onthophagi* have been described I regard only 84 at most as at present deserving to stand, and to these I now add 26 new species, bringing up the total number to 110.

The descriptions of the Australian *Onthophagi* are scattered through the Transactions of a great number of Societies,—European and Australian,—and the types through a great number of European and Australian Museums; probably not a few of the types have perished. Many of the descriptions,—especially those of the species from the Port Essington region and from the far North of W. Australia,—are of so slight a character as to be absolutely useless without examination of the types or at least of specimens known to be from the original locality. Under these circumstances there is no one in a position to deal with the Australian *Onthophagi* in any final or authoritative manner. The only method by which such an end can be even approached is that of the provision, by someone possessing data that are at least exceptionally plentiful, of a memoir bringing together the results of a careful study of all the existing descriptions and indicating the characters of the different species in a collective form. This can be no more than a provisional treatise, but it will at least be a foundation for further investigation, and the (probably numerous) inaccuracies that such a tentative revision must contain can be corrected by those who have the means of examining the types that its author has not had access to. Such an essay seems to be the inevitable first step towards a satisfactory treatment of the subject. I happen to possess, or have access to, a considerable number of specimens from the localities that I have mentioned above as those of the most insufficiently described Australian *Onthophagi*, and therefore have been able to identify with some confidence most of Hope's species. The specimens referred to were taken by my friend the late Dr. Bovill, by Mr. J. G. O. Tepper, and by Inspector Fœlsche,—those of the last two named being in the S. Australian Museum. I think, therefore, that I am in a somewhat exceptionally favorable position for furnishing a tentative revision of the Australian *Onthophagi* which I now lay before the Royal Society of S. Australia, not with the expectation that it will prove in all respects accurate, but with the hope that it may prove to be a fresh starting point and will elicit information from various sources by means of which something more satisfactory may follow. I trust it will be found possible at least to identify by means of the following descriptions and notes the insects to which I attribute the various specific names and if so it will be easy for those who have access to types that are not within my reach to call attention to the points that require amendment.

Of the 84 already described Australian *Onthophagi* that seem likely to be valid species, 53 are, I think, before me, leaving 31 which I have not to my knowledge seen. In the following pages there will be found first a tabulation of these 53 species and of the 26 new ones described below; second, descriptions of the new species and notes on a good many of the older ones; third, a tabulation of the characters of the species not known to me drawn up after careful study of the descriptions of their authors (this, of course, has to be founded on such characters—often very unsatisfactory—as the authors have happened to mention); and fourth, a few notes on each of the species not known to me, quoting where it seems desirable the salient points in the descriptions. This last part seems necessary in order to render the memoir complete, although in several instances I have been able only to furnish a brief abstract of notes that are not readily accessible in Australia.

To the difficulties I have already indicated as hindering a satisfactory treatment of the Australian *Onthophagi* must be added this, that there is no genus in which the difference between the sexes is in most species more strongly marked or more variable, while at the same time, so far as I know, there is no invariable external character by which the sex of a specimen can be determined positively. I believe that elongation of the front tibiæ is invariably a male character, but there are many species in which the tibiæ of the male are not elongated; similarly, a great development of frontal protuberances is usually a male character, but in most (if not all) species these characters are enfeebled in some males to the extent of being unrecognisable, and in a few species the frontal protuberances are stronger in the females than in the males. The front of the pronotum is, I think, never more complex in the female than in the male, and in general it is similar in character in both sexes of a species, but more feeble in development in the female, but there are a few species in which it is *essentially* different in the sexes. It is not usual for the puncturation of the pronotum and elytra to differ much sexually, but here again there are exceptions. Nevertheless, it has been the general practice of authors to form subdivisions of the genus on the sexual characters. De Harold, for instance, Ann. Mus. Gen., 1877, p. 51, says that the primary divisions are dependent on whether the male frontal protuberances are median or lateral. There is no need to discuss here the soundness of that opinion in the abstract, though I may say in passing that as far as I am concerned I do *not* believe the sexual characters to be the most fundamental, but the practical inconvenience of such a classification is obvious—so obvious, indeed, that there is no occasion to do more than just mention it.

The non-sexual characters that I find to be most reliable for distinguishing species are in the basal structure of the pronotum (this character is recognised by Dr. Erichson in the "Insecten Deutschlands" for sub-dividing *Onthophagus*), the size and structure of the eyes, the coloring (metallic or non-metallic) of the surface, the puncturation (which does not usually vary sexually to any considerable extent), the presence or absence of pilosity on the upper surface, and the structure of the claws.

For tabulating the genus, as regards its Australian species, I adopt six divisions founded primarily on the structure of the base of the pronotum, which assumes four different forms, and secondarily on the structure of the eyes.

In the first group the lateral gutter and marginal raised edging of the pronotum pass evenly across the base without the lateral edging becoming enfeebled close to the hind angles, and the eyes are wide, nitid, and not perceptibly facetted on the urface.

In the second group the base of the pronotum is as in the first group, except that the raised edging is suddenly and notably enfeebled close to the hind angles, while the eyes are as in the first group.

In the third group the structure of the pronotum is as in the second group, but the eyes are very distinctly facetted.

In the fourth group the base of the pronotum is not strictly speaking margined, but it is *visible* as a narrow more or less flattened band,—this pseudo-margin being most conspicuous when looked at obliquely from behind. The eyes are variable in structure.

In the fifth group the base of the pronotum has no gutter or flattened space but is bordered by a more or less defined raised edging. In many instances care is necessary in examining this edging to avoid confusing it with a fine carina-like projection hindward on the hind face of the base of the pronotum which is present in (at least most of) the *Onthophagi* and seems to be related to a depression on the front face of the elytra. The eyes in this group are variable in structure.

In the sixth group the base of the pronotum is absolutely even and is not bordered by any gutter, raised line or depression. The structure of the eyes is variable.

It would be possible to increase the number of groups by three if full use were made of the characters of the eyes in Groups 4, 5, and 6; but as this would remove into different groups species that seem too closely related for such separation I have contented myself with the six groups specified above. As it is, there are species which seem to connect Groups 4 and 5 rather closely with Group 6, but such overlapping is almost always met with in the division of an extensive genus into groups.

The following tabulation shows the relation to each other of the groups :—

A Raised marginal edging of sides of pronotum continues evenly along the base (all the known species large and rugulose) ... ... Group I.
AA. The raised marginal edging of sides of pronotum becomes at least enfeebled at the hind angles.
B. Pronotum bordered at base by a distinct gutter and raised edging.
C. Eyes not visibly facetted on surface ... ... Group II.
CC. Eyes distinctly facetted on surface ... ... Group III.
BB. Pronotum bordered at base only by a pseudo-margin (as described above) ... ... Group IV.
BBB. Pronotum bordered at base only by a raised line ... Group V.
BBBB. Pronotum not margined at base ... ... Group VI

It should be added that occasional specimens of those *Onthophagi* the surface of whose eyes is not perceptibly facetted have the eyes of a pale colour,—perhaps due to immaturity,—and that in that case underlying facets are quite conspicuous through the smooth surface, but there is not any difficulty in seeing that the surface itself is quite smooth.

In the following tabulation the characters cited (unless otherwise stated) are as far as known to the author common to both sexes.

It is quite possible that the examination of the other sex of some few species of which I have seen only one sex may prove that I have in tabulating relied upon characters that are not truly specific in respect of those particular species, but I am very confident that all the *Onthophagi* before me and tabulated below as distinct species, are really so.

Tabular statement of the characters of the Australian *Onthophagi* :—

GROUP I.

A. A horn or tubercle in both sexes on pronotum between median protuberance and lateral margin.
B. The frontal projection in both sexes a horn pentacanthus, *Har.*
BB. The frontal projection in both sexes a lamina ... ... Leai, *Blackb.*
AA. No horn or tubercle in either sex on pronotum between median protuberance and lateral margin.
B. The front of the frontal horn rugulose and opaque ... ... Mniszechi, *Har.*
BB. The front of the frontal horn (at any rate in the male) nitid and almost smooth ... ferox, *Har.*

GROUP II.

A. Front of pronotum subvertical (in both sexes so far as known).
B. The retuse front topped by a widely arched carina and (on each side) a tubercle.
C. The basal gutter of the pronotum dilated hindward in the middle.

D. Lateral edging of pronotum in front of middle strongly raised.
E. Interval between the two external tubercles of pronotum not or scarcely wider than head.
F. Hind part of pronotum very nitid and mostly smooth ... ... laminatus, *Macl.*
FF. Pronotum (except retuse front) entirely rugulose and but little nitid ... ... Cowleyi, *Blackb.*
EE. Interval between the two external tubercles of pronotum much wider than head... ... ... atrox, *Har.*
DD. Lateral edging of pronotum much finer and much less elevated ... Palmerstoni, *Blackb.*
CC. Basal gutter of pronotum not dilated hindward in middle.
D. Clypeal carina angularly elevated in middle.
E. Clypeal carina strongly angulate on either side before reaching margin Sloanei, *Blackb.*
EE. Clypeal carina not angulate laterally ... ... pugnax, *Har.*
DD. Clypeal carina not angularly elevated in middle ... ... pugnacior, *Blackb.*
BB. Retuse front of pronotum not as in "B."
C. Front of clypeus emarginate ... capitosus, *Har.*
CC. Front of clypeus widely and very feebly (or not) sinuous ... ... nodulifer, *Har.*
AA. Retuse front of pronotum very oblique, and descending from *at* (or behind) the middle.
B. Less nitid. Declivous front of pronotum scarcely carinate longitudinally ... declivis, *Har.*
BB. More nitid. Declivous front of pronotum strongly carinate down middle ... desectus, *Macl.*

GROUP III.

A. Dorsal surface devoid of metallic colouring (retuse front of pronotum topped by two subcontiguous protuberances).
B. Pronotum not (or scarcely) punctulate ... macrocephalus, *Kirby.*
BB. Pronotum closely and quite strongly punctulate ... ... capella, *Kirby.*
AA. Dorsal surface green, more or less metallic (retuse front of pronotum topped by four protuberances).
B. Dorsal surface opaque ... ... Bovilli, *Blackb.*
BB. Dorsal surface nitid ... ... conspicuus, *Macl.*

GROUP IV.

A. Eyes not (or scarcely) perceptibly facetted on surface.
B. Retuse front of pronotum topped by strong protuberances ... ... Erichsoni, *Hope.*
BB. Retuse front of pronotum not topped by protuberances.
C. Front of pronotum with a fine median longitudinal carina ... ... Howitti, *Blackb.*

CC. Front of pronotum even.
D. Hind claws large, and at base almost rectangularly bent.
E. Disc of metasternum non-punctulate — Kingi, *Har.*
EE. Disc of metasternum coarsely punctulate ... ... — parvus, *Blanch.*
DD. Claws fairly large, but of normal structure.
E. Disc of metasternum non-punctulate — glabratus, *Hope.*
EE. Disc of metasternum with coarse punctures.
F. Head not bicarinate in either sex.
G. Front of clypeus emarginate ... — Murchisoni, *Blackb.*
GG. Front of clypeus not emarginate ... ... — fitzroyensis, *Blackb.*
FF. Head bicarinate (at any rate in one sex) ... ... — queenslandicus, *Blackb.*
AA. Eyes conspicuously facetted on surface.
B. Eyes comparatively wide.
C. Retuse front of pronotum topped by a strong carinate protuberance ... — picipennis, *Hope.*
CC. Retuse front of pronotum protuberant, but not carinate ... ... — bicornis, *Macl.*
BB. Eyes much narrower.
C. Pygidium not clothed with long or close white or silvery pubescence.
D. Sides of pronotum decidedly (or strongly) sinuate behind middle.
E. Upper surface more or less metallic (if only slightly, then densely opaque).
F. Sides of pronotum not sinuate in front of middle.
G. Pronotum subnitid, quite strongly punctulate ... ... — australis, *Guér.*
GG. Pronotum opaque, its puncturation very faint.
H. Crenulations of elytra distinctly punctiform ... — anisocerus, *Er.*
HH. Crenulations of elytra not punctiform ... ... — fuliginosus, *Er.*
FF. Sides of pronotum strongly sinuate in front of middle ... — tweedensis, *Blackb.*
EE. Black, not at all metallic ... — Mastersi, *Macl.*
DD. Sides of pronotum non-sinuate behind middle ... ... — pexatus, *Har.*
CC. Pygidium clothed with long (or at least dense) whitish or silvery pilosity.
D. The dorsal surface (except pygidium) glabrous or nearly so.
E. Neither pronotum nor elytra bicolorous.
F. Punctures of elytral striæ large and coarse ... ... — cuniculus, *Macl.*
FF. Punctures of elytral striæ fine.
G. Clypeal carina strongly angulate on either side ... — auritus, *Er.*

GG. Clypeal carina not or scarcely angulate at sides (at any rate in male) ... ... Walteri, *Macl.*

EE. Both pronotum and elytra bicolorous ... ... rufosignatus, *Macl.*

DD. Dorsal surface clothed with dense erect pilosity ... ... granulatus, *Bohem.*

GROUP V.

A. Eyes comparatively wide scarcely visibly facetted on their surface.

B. Elytra clothed with conspicuous erect setæ (size moderate; Long., 4 l.) ... ... Macleayi, *Blackb.*

BB. Elytra glabrous (size very small).

C. Elytral interstices convex, closely and conspicuously punctulate ... ... Helmsi, *Blackb.*

CC. Elytral interstices flat, very sparsely and inconspicuously punctulate ... Koebelei, *Blackb.*

AA. Eyes narrow, conspicuously facetted.

B. Elytra clothed with long conspicuous pilosity ... ... aureo viridanus, *Blackb.*

BB. Elytra not clothed with long pilosity.

C. Pronotum very coarsely and closely rugulose (size large, Long. 5 l. or more) rugosus, *Kirby.*

CC. Pronotum finely and confluently asperate.

D. Elytra tuberculate ... ... Haagi, *Har.*

DD. Elytra not tuberculate ... ... Adelaidæ, *Hope.*

CCC. Pronotum conspicuously and not confluently punctulate.

D. Basal joint of hind tarsi strongly compressed, and strongly crenulate on margin ... . consentaneus, *Har.*

DD. Basal joint of hind tarsi normal.

E. Eyes notably less narrow than in the species under "EE."

F. Pronotum evenly convex in hind part ... ... mutatus, *Har.*

FF. Pronotum distinctly sulcate longitudinally in hind part.

G. Sides of prothorax very distinctly sinuate behind middle.

H. Basal edging of pronotum strong and thick ... victoriensis, *Blackb.*

HH. Basal edging of pronotum much finer .. ... Tamworthi, *Blackb.*

GG. Sides of pronotum scarcely sinuate behind middle ... Frenchi, *Blackb.*

EE. Eyes extremely narrow, sublinear.

F. Pronotum more or less strongly sulcate longitudinally in hind part.

G. Puncturation of pronotum extremely coarse (and the general surface nitid) in both sexes .. henleyensis, *Blackb.*

GG. Puncturation of pronotum evidently less coarse (in both sexes).

H. Long pilosity on front part of dorsal surface of pronotum in both sexes ... ... jubatus, *Har.*
HH. Pronotum non-pilose.
I. General surface opaque, pronotum extremely closely punctulate (in both sexes) nanus, *Waterh*
II. General surface nitid, pronotum not closely punctulate (at least in one sex) pontilis, *Blackb.*
FF. Pronotum without any trace of longitudinal sulcus.
G. Antennal club obscure.
H. Puncturation of elytral interstices (especially near suture) fine and sparse,—at least in male ... ... Zietzi, *Blackb.*
HH. Puncturation of elytral interstices (and of the striæ) very much coarser ... nitidior, *Blackb.*
GG. Antennal club yellow ... blackwoodensis, *Blackb.*

GROUP VI.

A. Eyes wide, their surface not (or but little) perceptibly facetted.
B. Dorsal surface clothed with pilosity ... latro, *Har.*
BB. Dorsal surface not pilose.
C. Surface of eyes very nitid, not perceptibly facetted.
D. Claws moderate, normally arched ... pronus, *Er.*
DD. Claws large, bent almost rectangularly at base.
E. Disc of metasternum impressed with coarse punctures.
F. Greatest width of prothorax (viewed from above) considerably in front of middle ... ... submuticus, *Blackb.*
FF. Greatest width of pronotum (viewed from above) at middle inermis, *Macl.**
EE. Disc of metasternum devoid of course punctures ... ... muticus, *Macl.*
CC. Surface of elytra much less nitid,—evidently facetted ... ... Comperei, *Blackb.*
AA. Eyes narrow, their surface conspicuously facetted (quite granulate).
B. Dorsal surface setose or pilose.
C. The elytral interstices equal (or nearly so) *inter se.*
D. Elytral striæ shallowly sulciform (as wide as the interstices) .. ... geelongensis, *Blackb.*
DD. Elytral striæ narrow (very much narrower than the interstices).
E. Dorsal surface metallic... ... margaretensis, *Blackb.*
EE. Dorsal surface non-metallic ... Fletcheri, *Blackb.*

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* The single specimen before me that I take to be this insect has lost its claws, but it is so evidently close to *muticus*, Macl., &c., that I have no doubt its claws are like those of *muticus*.

CC. Alternate elytral interstices strongly elevated ... ... asper, *Macl.*

BB. Dorsal surface not setose nor pilose.

C. Elytra opaque and densely coriaceous, with flat almost puncturelessinterstices posticus, *Er.*

CC. Elytra not as in *posticus*, Er.

D. Neither pronotum nor elytra bicolorous.

E. Pronotum not confluently punctulate.

F. Punctures of elytral striæ well defined, not confused with those of the interstices (which are much finer).

G. Pronotum with an evident longitudinal sulcus in hind part.

H. Front part of pronotum rugulose. Size moderate, more than 4 l. long ... .. Dunningi, *Har.*

HH. Front part of pronotum not rugulose. Size small, less than 3 l. long ... Dumbrelli, *Blackb.*

GG. Pronotum evenly convex across hind part ... sydneyensis, *Blackb.*

FF. Punctures of elytral striæ much confused with coarse interstitial puncturation ... ... negatorius, *Blackb.*

EE. Pronotum confluently and asperately punctulate ... ... subocelliger, *Blackb.*

DD. Pronotum unicolorous, elytra bicolorous.

E. Elytra opaque ... ... rubrimaculatus, *Macl.*

EE. Elytra nitid.

F. Elytral interstices finely punctulate ... ... quadripustulatus, *Fab.*

FF. Elytral interstices coarsely punctulate ... ... bipustulatus, *Fab.*

DDD. Both pronotum and elytra bicolorous ... ... cruciger, *Macl.*

O. Cowleyi, sp. nov. Latus; robustus; supra glaber; subtus fulvo-hirtus; subnitidus; ferrugineus vel piceus, antennarum clava rufo-testacea; clypeo transversim rugato; sutura clypeali carinata; carina frontali ut lamina erecta utrinque leviter vel vix sursum producta; oculis convexis, vix manifeste granulatis, latis (horum latitudine quam antennarum clavæ vix minori); prothorace quam longiori ut 18 ad 11 latiori, supra antice retuso, parte retusa lævi vel potius obsolete punctulata, cetera parte grosse fortiter rugulosa postice longitudinaliter impressa, parte dorsali media antice carina forti transversa arcuata integra marginata tuberculo sat magno conico utrinque pone oculum supra partem retusam sito, fovea magna laterali fortiter impressa, lateribus modice arcuatis antice et postice sat fortiter sinuatis,

angulis anticis sat dentiformibus posticis obtusis, sulco laterali marginali trans basin continuo in medio manifeste subangulatim retrorsum dilatato, carina marginali laterali trans basin minus perspicue continua; elytris leviter crenulato-striatis, crenulis quam striæ vix latioribus, interstitiis subtiliter coriaceis parum convexis leviter (latera versus magis profunde) punctulatis; pygidio coriaceo sat crebre minus profunde punctulato; metasterno coriaceo sat sparsim subgrosse punctulato.

Maris clypeo antice sat producto plus minusve emarginato, lateribus antice sinuatis; tibiis anticis sat elongatis, minus latis, extus sat fortiter 4-dentatis.

Feminæ clypeo antice vix producto subtruncato, lateribus antice haud sinuatis; tibiis anticis minus elongatis magis fortiter 4-dentatis. Long., 7—8¼ l.; lat., 4—4½ l.

There is very little reliable external difference between the sexes except in the form of the clypeus and the structure of the front tibiæ. In a well developed male the ends of the frontal lamina are produced upward as quite strong teeth; in the female and in some males this upward dilatation is quite slight. Looked at from in front the whole dorsal surface of the head behind the clypeal carina seems to consist of this frontal lamina,—the surface sculpture of which varies considerably (from being strongly to only lightly rugulose) and does not depend on sex. The species which I regard as *O. atrox*, Har., is very close to *O. Cowleyi*, differing from it chiefly by the hinder elevation on its head being in the male a mere tranverse cariniform line, by the transverse carina above the retuse front of the pronotum having its extremities so far from each other that each of them is directly behind the middle of one of the eyes, by the same carina running in the form of two sides of a triangle the apex of which is truncate and slightly emarginate, by the retuse front of the pronotum being pilose and punctulate, by the interstices of the elytra being flatter, more opaque, and less distinctly punctulate, and by the distance between the external tubercles of the pronotum being a little less than the width of the head.

N. Queensland (sent by the late Mr. Cowley).

O. laminatus, Macl. I think I have correctly identified this insect. The sculpture of the front part of the pronotum is very insufficiently described, and there are several species that fit the description in this respect; but in characterising the *puncturation* of the pronotum Sir W. Macleay says "the greater portion of the rest of the prothorax is punctured," and I find one species (and one only) of this group to which those words apply satisfactorily since on its pronotum the coarse rugulosity that occupies the area immediately behind the retuse front becomes rapidly

obsolete hindward and is very faint or altogether wanting on nearly the hinder half of the dorsal surface. Apart from the character just referred to, this insect is very close to *O. Cowleyi*, Blackb. The arched transverse carina of the pronotum is however less strongly arched, with its extremities further from each other; the extremities of the frontal lamina are (in all the examples before me) much more strongly produced upward than in *O. Cowleyi* of same sex; and the front tibiæ of the male are notably more slender and elongate, there being about nine crenulations on the external outline above the uppermost of the large teeth, while in *O. Cowleyi* there are only six or seven. The distance between the external tubercles of the pronotum is less than the width of the head.

O. quinque tuberculatus, Macl. Some years ago while staying in Sydney I inspected the type of this insect, and made a note against it in my Catalogue "? = *atrox*, Har." I do not attach much importance to this note inasmuch as it was probably not founded on comparison with, but only on memory of, *atrox*; nevertheless I have little doubt from the description of *5-tuberculatus* that it is identical with the insect that I believe to be *atrox*, because that is the only *Onthophagus* (of this Group) known to me as inhabiting Eastern Australia the structure of whose pronotum would be likely to suggest the name *5 tuberculatus* and because the description contains no mention of any other character inconsistent with identity, unless it be the expression "finely punctulate" applied to the insect in general, which does not suit *atrox* except in respect of the elytra. It must be noted however that Macleay is extremely vague in describing the puncturation of the different parts of his *Onthophagi*, not always referring to it at all and in other instances only using the word "punctulate." At any rate if *5-tuberculatus* is not *atrox* it is a species I have not seen, and I have examined a large number of *Onthophagi* from Queensland (its habitat).

O. atrox, Har. From the above notes (on the preceding species) the *Onthophagus* that I have called by this name will be easily identified. It is the only one of this group known to me having the retuse front of its pronotum pilose If my identification is incorrect it can easily be corrected by anyone who can examine the type of *atrox*. It can be regarded as having 5 tubercles placed in a transverse line along the summit of the retuse front of the pronotum, inasmuch as each extremity of the tranverse carina is slightly prominent in most examples and the middle of the carina by a little stretch of imagination may be counted as a somewhat bifid tubercle. The external tubercle on either side is well defined. The interstices of the elytra are

very flat opaque and very finely punctulate, especially those near the suture. The frontal carina is very feeble in the male and not elevated into a tooth or horn (at most only angular) at its extremities in either sex. The distance between the external tubercles of the pronotum is a little greater than the width of the head.

O. Palmerstoni, sp. nov. Sat brevis, lateribus sat rotundatis; supra glaber; subtus fulvo-hirtus; modice nitidus; obscure rufus, antennis dilutioribus; capite fere ut *O. Cowleyi*, sed lamina frontali ad latera nullo mode elevata et oculis nonnihil angustioribus; prothorace fere ut *O. Cowleyi* sed supra minus crebre ruguloso (basin versus haud ruguloso sed concinne subsparsim minus profunde punctulato), parte subbasali ipsa anguste lævi opaca, angulis posticis magis definitis; elytris subtiliter crenulato-striatis, striis subnitidis, crenulis quam striæ nullo modo latioribus, interstitiis planis (latera versus leviter convexis) opacis coriaceis vix manifeste punctulatis; pygidio coriaceo, leviter sparsim punctulato; metasterno coriaceo sat sparsim modice punctulato Maris(?) clypeo antice minus producto subemarginatim truncato, lateribus antice vix sinuatis; tibiis anticis modice elongatis, minus latis, extus sat fortiter 4-dentatis. Long., $5\frac{3}{4}$ l.; lat., $3\frac{1}{5}$ l.

The unique specimen before me of this insect has front tibiæ scarcely so long and narrow as those of the male of *O. Cowleyi* but much more so than those of the female of that species; I think therefore that it is a male. There are about 7 crenulations on the edge of the front tibiæ above the uppermost of the large teeth. The most satisfactory characters for distinguishing it from the other *Onthophagi* of this group seem to be the puncturation of the pronotum and the surface sculpture of the elytra. The former does not (as it does in *O. laminatus*, Macl.) become faint and scarcely impressed behind the middle, but changes from being (in the middle of the dorsal surface) close and rugulose vermiculate sculpture to become behind the middle isolated deeply impressed sparse strong non-rugulose punctures. The distance between the external tubercles of the pronotum is less than the width of the head. The elytral striæ are exceptionally fine and the dorsal interstices absolutely flat and as opaque as those of the species referred to above as *O. atrox*, Har.,—so that (as in the latter) the striæ appear nitid in contrast. The pronotum is more nitid than in any other *Onthophagus* known to me (of this group) except *laminatus*, Macl. The absence of upward projection at the ends of the frontal lamina distinguishes this insect from *laminatus* and *Cowleyi* of both sexes but the degree of upward projection in those species varies too much to justify

laying much emphasis on this character on the strength of a single specimen. Viewed from in front the frontal lamina looks to be a nitid almost punctureless quadrate plate sloping hindward and upward from the clypeal carina (which forms its base) and having all its sides sharply defined right lines or nearly so (which is the case also with specimens of *O. Cowleyi* having a feebly developed lamina but no other known to me of the group) Viewed from behind the frontal lamina looks like that of the female of the Brisbane species which I take to be *O. pugnax*, Har. *(vide infra)* while in *O. Cowleyi* the corresponding lamina looks quite different owing to the upward projection being (in all specimens examined) quite conspicuous. This is the smallest *Onthophagus* I have seen of this group.

N. Australia (Palmerston).

O. Sloanei, sp. nov. Latus; robustus; supra glaber; subtus fulvo-hirtus; opacus (pronoto capiteque leviter subnitido); ater, antennis rufo-testaceis; capite minus lato, ante oculos parum dilatato; clypeo transversim rugato antice angulatim emarginato; capitis parte inter carinas crebre fortiter punctulata, sutura clypeali carinata in medio leviter angulatim elevata; oculis ut *O. Cowleyi*, Blackb.; prothorace quam longiori ut 11 ad 7 latiori, supra antice retuso, parte retusa sat manifeste sat crebre punctulata, cetera parte grosse fortiter rugulosa postice longitudinaliter vix impressa, parte dorsali media antice carina transversa arcuata (hac in medio profunde sinuata et utrinque tuberculo parvo terminata) marginata, tuberculo sat magno conico utrinque sito, fovea magna laterali fortiter impressa, lateribus angulisque ut *O. Cowleyi*, sulco laterali marginali trans basin continuo in medio subangulato sed vix dilatato, carina marginali laterali trans basin sat fortiter continua; elytris obsolete (latera versus minus obsolete) crenulato-striatis, crenulis quam striæ haud latioribus, interstitiis planis (lateralibus leviter convexis) coriaceis (humeris nitidis haud coriaceis) sparsim subtilissime (latera versus magis fortiter) punctulatis; pygidio coriaceo et metasterno sat fortiter punctulatis.

Maris carina frontali quam clypealis vix magis elevata; tibiis anticis sat elongatis, minus latis extus sat fortiter 4-dentatis.

Feminæ carina frontali sat elevata, utrinque sursum producta; tibiis anticis minus elongatis, magis latis, extus magis fortiter 4-dentatis. Long., 7—7¾ l.; lat., 4—4½ l.

To a casual glance extremely like the species called *O. atrox*, Har. (above), but differing from it (independently of sexual characters) by the clypeus strongly emarginate in both sexes, the glabrous retuse front of the pronotum, the narrower head (very

little expanded in front of the eyes) and the base of the pronotum with its marginal furrow rather narrow and not dilated and flattened in the middle, and its marginal raised edging much stronger. The distance between the external tubercles of the pronotum is much greater than the width of the head. I have named this species after Mr. T. G. Sloane, who is doing such admirable work on the Australian *Carabidæ*.

N.W. Australia.

O. pugnax, Har. Judged by the description this species must be very close to *O. atrox*, Har., although its author does not refer to the other in the description of either. I have examples of an *Onthophagus* from Brisbane (the habitat cited by Harold) which I think must be *pugnax*, and they are extremely close to the species that I have (above) called *atrox*. They are of shorter and broader build and are not so opaque; the retuse front of their pronotum is not pilose and the structure of the base of their pronotum is as in *O. Sloanei*, from which species they differ *inter alia* in the front of their clypeus not being emarginate. The distance between the external tubercles of their pronotum is greater than the width of the head. The differences between *pugnax* and *atrox* in respect of the sexual characters of the head appear to be chiefly in degree rather than kind, and I cannot attach very much importance to them.

O. pugnacior, sp. nov. (mas). *O. Sloanei*, Blackb., maris affinis; differt capite pronotoque paullo minus nitidis; illo latiori, ante oculos sat fortiter dilatato; clypeo brevi latissimo antice rotundato; carina clypeali subobsoleta, in parte mediana nullo modo elevata, carina frontali antrorsum fortiter arcuata; pronoti parte retusa subobsolete punctulata, dorso minus fortiter ruguloso, carina arcuata transversa leviter tantum sinuata nullo modo tuberculata; elytrorum humeris coriaceis haud nitidis; metasterno (lateribus exceptis) multo minus fortiter punctulato. Long., 7¾ l.; lat., 4 l.

This species is so closely allied to *O. Sloanei*, that it seems useless to repeat the diagnosis at full length; the diagnosis applies exactly to this species except in so far as specified above. The extreme feebleness of the clypeal carina makes the frontal carina (without being absolutely more elevated than in *Sloanei*) much more elevated in comparison with the former. The external teeth of the front tibæ are much more feeble in my example of *pugnacior* than in *Sloanei*, but I doubt whether this is a constant character. The structure of the basal margin of the pronotum readily distinguishes *pugnacior* from all the other species known to me of this group except *Sloanei* and the species mentioned above as *pugnax*, Har. It is even closer to the latter than to *Sloanei*, from which it differs in all the respects mentioned above

as distinctions from *Sloanei* except the form of the front margin of the clypeus, and the structure of the transverse carina of the pronotum, in which it resembles *pugnax*. The frontal carina viewed from behind is an elevated line forming a regular strong curve with its convexity forward, while in *pugnax* and *Sloanei* it is sinuous with its median part widely and feebly curved in the opposite direction. The clypeus is much shorter and wider than in any other species known to me of this group. The distance between the external tubercles of the pronotum is a little greater than the width of the head.

N. Queensland.

O. Bovilli, sp. nov. Sat latus, supra glaber; subtus fulvo-hirtus; sat opacus coriaceus; obscure viridis (corpore subtus et pygidio nigricantibus, elytris piceis parum viridescentibus), tarsis palpis antennisque ferrugineis (harum clava testacea); capite modice lato; clypeo transversim rugato antice truncato, sutura clypeali carinata; lamina frontali modice elevata, ad angulos vix prominenti; capite inter carinas ruguloso; oculis sat angustis, manifeste granulatis, prothorace quam longiori ut 18 ad 11 latiori, supra antice breviter retuso, parte retusa sat obsolete punctulata, cetera parte grosse crebre rugulosa postice longitudinaliter obsolete sulcata, parte dorsali media anguste antrorsum prominenti (et subcarinato-marginata) in medio emarginata, tuberculo sat magno utrinque sito, angulis anticis subdentiformibus posticis rotundato-obtusis, fovea laterali fortiter impressa, lateribus ante medium leviter (pone medium modice) sinuatis, sulco laterali marginali trans basin continuo haud in medio dilatato, carina marginali trans basin continua, basi leviter trisinuata; elytris leviter crenulato-striatis, crenulis quam striæ haud latioribus, interstitiis subconvexis crebrius sat obsolete punctulatis, humeris nitidis haud coriaceis; pygidio metasternoque obsolete punctulatis; tibiis anticis sat brevibus; unguiculis modicis. Long., $4\frac{1}{2}$ l.; lat., $2\frac{3}{5}$ l.

Very distinct from all the species of the *laminatus* group (with which group it agrees superficially and in most characters) by its conspicuously granulate and much narrower eyes. These resemble the eyes of *O. conspicuus*, Macleay, which is a very much more nitid and brilliantly metallic insect, with the pronotum in both sexes much less closely and rugulosely punctured, and with the punctures of the elytral interstices very much finer (indeed almost wanting). The type is in the S. Australian Museum. It is probably a female. Named after the late Dr. Bovill.

Northern Territory of S. Australia.

O. desectus, Macl. I agree with Mr. C. O. Waterhouse, Ann.

N.H. (VI.) XIV., that Harold was probably mistaken in regarding this species as a synonym of *declivis*, Har. I have before me a Queensland specimen which I compared some years ago with the type of *desectus* and found to be identical. It is, I think, certainly distinct from *declivis* from which (of same sex, female) it differs by its considerably more nitid surface, the quite strong emargination of the middle of the frontal carina, the much more conspicuous longitudinal carina occupying the middle of the retuse portion of the pronotum, and the much larger and deeper punctures of the metasternum. It would be interesting to know what species it was that Sir W. Macleay regarded as *declivis*, Har., in 1888, when he reported that species as occurring in N.W. Australia. If he considered it as identical with *desectus* (i.e., if by *declivis* he meant *desectus*) then in all probability the insect from N.W. Australia that he described (Proc. L.S., 1888, p. 899) under the name *devexus* as "very like *O. declivis*, but of a much coarser and rougher sculpture" was the true *declivis*. The remainder of the description fits *O. declivis*, Har., very well except in the mention of the frontal carina being "very minutely emarginate in the middle." I have not seen any example of *declivis* of either sex having that carina emarginate, but there is certainly sufficient tendency to variation in the frontal structure of the *Onthophagi* to render it very inexpedient to found a species upon slight differences in that character alone.

O. *Schmeltzi*, Har. I have no doubt but what this is a variety of *O. capella*, Kirby. There is absolutely nothing in its author's description and remarks to differentiate it from *capella* except the form of the frontal lamina in the male, and even that is a mere difference in the shape of the outline of the portion connecting the erect extremities.

O. macrocephalus, Kirby. Sat latus; supra glaber; subtus fulvohirtus; minus nitidus; niger, antennis ferrugineis, clava testacea; clypeo transversim rugato; sutura clypeali sat fortiter carinata; carina frontali sat alta; capite inter carinas nitido obsolete punctulato; oculis convexis manifeste granulatis, sat angustis (horum latitudine quam antennarum clavæ fere duplo minori); prothorace quam longiori ut 18 ad 11 latiori, supra antice retuso, fere lævi vel potius obsoletissime (latera versus paullo magis perspicue) punctulato, parte dorsali media antice tuberculis 2 (ut *O. capellæ*, Kirby) instructis, tuberculis inter hos et margines laterales nullis, fovea magna laterali fortiter impressa, lateribus fortiter arcuatis postice fortiter sinuatis, angulis anticis (ut *O. capellæ*) subobtusis posticis valde obtusis, sulco marginali laterali trans basin continuo in medio vix dilatato, carina marginali trans basin continua (prope angulos sat obsoleta,

in medio sat forti); elytris leviter crenulato-striatis, crenulis quam striæ haud latioribus, interstitiis sat convexis coriaceis suturam versus obsolete (latera versus magis perspicue) punctulatis; pygidio coriaceo leviter minus crebre punctulato.

Maris clypeo antice sat producto-acuminato et reflexo, lamina frontali pervariabili (vel paullo supra oculos truncata, vel plus minusve sursum producta et acuminata).

Feminæ clypeo antice sat late rotundato parum reflexo; lamina frontali minus elevata utrinque plus minusve sursum acuminata. Long., $6\frac{1}{2}$—$7\frac{1}{2}$ l.; lat., $3\frac{2}{5}$—$4\frac{1}{5}$ l.

It has seemed to me desirable to redescribe this species, as the original diagnosis is very brief and applies only to one sex. The development of the male characters varies to an extraordinary extent (from the form described by Kirby, down to a form in which the frontal elevation is merely a widely truncate feeble carina not much different from that of the female of *O. capella*). I have not, however, seen a male in which there is any upward projection of the *ends* of the frontal lamina,—this form being apparently distinctive of the female (though in some females exceedingly slight). The subacuminately produced, and somewhat strongly reflexed, clypeus of the male seems to be the most satisfactory distinction of that sex. I cannot satisfy myself that there is any workable distinction between the front tibiæ of the sexes. The tubercles at the summit of the middle of the retuse front of the pronotum vary in size inversely with the size of the frontal lamina,—so that those tubercles are at their maximum in the female and at their minimum in a highly developed male. As a species this *Onthophagus* is very distinct, its only near ally known to me being *O. capella*, Kirby, which has a strongly punctulate pronotum, elytral interstices almost absolutely flat, &c.

N.S. Wales.

O. capella, Kirby. I have found a specimen which evidently appertains to this species (it is not even a variety) among some *Coleoptera* sent to me from Cape York by the late Mr. Cowley.

O. capitosus, Har. A single (female) example from Cape York in my collection seems to be this species, although if so it is a colour variety, the head and prothorax being piceous, the elytra and pygidium clear ferruginous. It has the short clypeal carina attributed to *capitosus*, and the front of the clypeus emarginate as described. The front of the pronotum is only very slightly retuse. This is a very isolated species; the base of its pronotum is as in *O. capella*, Kirby, but it differs from *capella* and the rest of its group by, *inter alia*, its eyes not distinctly granulate (as in *declivis*, Har.).

O. picipennis, Hope. I am fairly confident that I know this

species, but only because I have before me some examples from the neighbourhood (Port Essington) that Hope cites as its habitat. The description is quite insufficient, and the name absurd,—as the author himself in his diagnosis says "elytris nigris." The phrase "thorace trigono" is very puzzling; I do not know of any *Onthophagus* that it would suit; following words describing the structure of the summit of the retuse front forbid the supposition that the phrase refers to that part having three angular projections. I have concluded that the reference must be to the strong dilatation of the prothorax near the front, making the front itself appear (when looked at casually, from behind, obliquely) very much wider than the base, so that with a little imagination the segment seems to have a certain resemblance to a triangle with the apex truncate. One of the specimens before me happened to be mounted in such a manner that this similarity is certainly traceable. The only other explanation I can suggest is that "thorace" may stand in error for "clypeo." "Capite ante oculos furcato" I take to refer to the hornlike upward prolongment of the ends of the frontal lamina. The species before me varies in colour from reddish piceous to black and is nitid (the club of the antennæ testaceous); the base of its pronotum is not strictly speaking margined, but a narrow marginal space is flattened, and not continuing evenly the hind declivity of the surface may be called a narrow pseudo-margin. The clypeal suture forms a carina abbreviated at each end; the frontal lamina is well-marked and its ends are elevated very variably; the clypeus is acuminate in front, with sinuous sides and reflexed apex; the eyes resemble those of *O. capella*, Kirby (fairly wide, and distinctly facetted); the pronotum is rather closely and not finely (but not deeply) punctulate (the punctures very sparse and faint on the retuse front and also near the base); the middle of the retuse front is topped by a strong widely and sinuously arched transverse carina; the sides of the pronotum are extremely strongly sinuate behind the middle but (viewed from above) non-sinuate in front of the middle; the front angles are roundly (but not widely) obtuse, the hind angles well defined and widely obtuse; the elytra are somewhat strongly crenulate-striate, the crenulations inclining towards being punctures; the elytral interstices are more or less convex (especially towards the sides) and evenly sparsely and not very finely punctulate; the pygidium is coriaceous and somewhat coarsely punctulate; the metasternum is finely sparsely and not deeply punctulate. If (as I believe to be the case) I have both sexes before me, the sexual differences are very feeble, the female having the clypeus less acuminate in front, the ends of the frontal lamina less produced and the retuse front of the pronotum less elevated and more distinctly punctulate.

An example from Cape York is very near to this species but differs in the transverse carina of the pronotum being evenly arched. I believe it to be a good species, but more specimens ought to be examined before it is described; it does not appear to have been described unless it should prove to be a variety of *picipennis*, Hope.

O. Erichsoni, Hope. Specimens that I have no doubt represent this species were sent to me from the Port Essington region by the late Dr. Bovill and there are other examples (from the same place) in the S. Australian Museum. In Masters' Catalogue *O. inermis*, Macl., is sunk as a synonym of this insect, but that seems to be clearly an error. The specimens before me belong to the same group of *Onthophagi* as those referred to above under the name *O. picipennis*, having a narrow flattened space forming a pseudo-margin at the base of the pronotum. It seems desirable to supplement Hope's brief description with the following particulars:—Clypeus rather strongly and narrowly produced and acuminate in the male (evenly rounded or nearly so, in female); puncturation of head none or very faint in male (in female transversely rugose on clypeus, feeble to strong elsewhere); eyes fairly wide, their surface smooth non-granulate (though in some examples underlying facets are visible through the smooth surface); clypeal suture carinate, entire; frontal carina very feeble in male, its ends more developed and—from some points of view—tuberculiform (in female better developed, with a somewhat quadrate projection in the middle); pronotum faintly (or scarcely) punctulate, a strong longitudinal sulcus on hind part, retuse in front, retuse front topped in male by a broad flattened anteriorly emarginate process which projects forward and slightly upward (in the female this is much smaller and almost divided into two, and there is a small tubercle at the external limit of the retuse front), sides strongly sinuate both in front of and behind the middle, front angles subacute, hind angles roundly obtuse; elytra strongly crenulate-striate, the crenulations tending to be punctures, interstices more or less convex and faintly but somewhat closely and not finely punctulate; pygidium with strong sparse punctures mixed with much finer ones; metasternum with strong punctures on the sides and hinder part; front tibiæ of male very evidently longer than of female and having a pencil of golden hairs at their inner apex (Long., $4\frac{1}{4}$—$4\frac{1}{2}$ l.).

O. Howitti, sp. nov. Latus; supra glaber; subtus fulvo-hirtus; sat nitidus; niger, tarsis palpis antennisque plus minusve ferrugineis (harum clava testacea); clypeo fortissime transversim rugato, antice haud vel vix sinuato; sutura clypeali fortiter carinata; carina frontali leviter elevata; capite inter carinas fortiter rugulose punctulato; oculis sat latis vix

manifeste granulatis; prothorace quam longiori ut 16 ad 11 latiori, antice leviter (maris?) vel vix (feminæ?) oblique retuso, antice crebre subrugulose vix fortiter (in cetera parte minus crebre nec rugulose, retrorsum gradatim magis obsolete) punctulato, antice longitudinaliter subtiliter carinato, postice longitudinaliter leviter canaliculato, foveis sublateralibus profundis, lateribus ante medium vix perspicue (pone medium fortiter) sinuatis, angulis anticis sat acutis (nullo modo dentiformibus) posticis obtusis bene definitis, basi anguste planata; elytris crenulatostriatis, crenulis leviter impressis subpunctiformibus, interstitiis sat planis vix perspicue punctulatis; pygidio crebrius subtilius punctulato; metasterno lævi (lateribus et parte antica sat grosse exceptis) punctulato; tibiis anticis sat brevibus.

Maris (?) carina frontali sat fortiter sinuata; elytris magis nitidis.

Feminæ (?) carina frontali fere recta; elytris minus nitidis, subtilissime coriaceis. Long., 5—5½ l.; lat., 3⅕—3½ l.

I believe my two specimens of this insect to be male and female, but the differences are not so strongly marked as not to be possibly variations of development in one sex; there is no decided distinction in the front tibiæ. The species superficially resembles the female of the *Onthophagus* mentioned above as *O. desectus*, Macl., but differs from it by its very evidently wider and shorter form, by its much more nitid surface (the specimen that I regard as a male has quite brilliantly nitid elytra and the female is not very much less nitid), by its pronotum much less retuse in front without anything like a tubercle at the top of the retuse part, by the absence of a turned-up edge at the base of the pronotum, by the very much less strong and close puncturation (which moreover is non-rugulose) of the hinder part of the pronotum, &c. In the specimen which I regard as the female of *O. Howitti* the hind one-third of the pronotum is all but non-punctulate.

Northern Territory of S. Australia.

O. Zietzi, sp. nov. Mas. Latus; supra glaber; subtus sparsim fulvo-hirtus; nitidus; niger, tarsis et antennarum basi picescentibus; clypeo crebre fortiter punctulato, antice emarginato; sutura clypeali fortiter carinata; carina frontali fortiter elevata, supra fortiter arcuatim emarginata; capite inter carinas sat grosse punctulato; oculis angustissimis minus subtiliter granulatis; prothorace quam longiori ut 18 ad 11 latiori, antice breviter retuso, sparsius minus fortiter punctulato, lateribus ante medium haud (pone medium parum perspicue) sinuatis, foveis sublateralibus bene definitis, angulis anticis

leviter obtusis parum productis posticis rotundato-obtusis, basi subtilissime elevato-marginata; elytris crenulato-striatis, crenulis punctiformibus quam striæ sat latioribus, interstiis fere planis sparsim subtilius (latera versus magis fortiter magis crebre) punctulatis; pygidio sparsim subtilius punctulato; metasterno fere lævi (parte antica lateribusque sat grosse punctulatis exceptis); tibiis anticis fortiter elongatis; unguiculis sat parvis. Long., 2 l.; lat., $1\frac{2}{5}$ l.

Very close to *O. nitidior*, Blackb., but seems to be certainly a distinct species. It is without the slight coppery tone of that insect. Its pronotum is scarcely margined at the base (in *nitidior* distinctly), the punctiform crenulations of its elytral striæ are considerably smaller, its elytral interstices are nearly flat and (especially those near the suture) are quite finely (in *nitidior* coarsely) punctulate, and its pygidium is very much more finely punctured. A single example (taken by Mr. Zietz) is in the S. Australian Museum.

Central Australia (Lake Callabonna).

O. bicornis, Macl. I have specimens from the Northern Territory evidently appertaining to this species. They are closely allied to those mentioned above as *O. Erichsoni*, Hope, but are much smaller (Long., 3—$3\frac{1}{2}$ l.). The frontal lamina in the female is straight and entire (without projections at ends or middle), in the male represented by two short isolated horns; the median projection topping the retuse front of the pronotum in the male is much like that of *O. Erichsoni*, and there is a conic tubercle on either side at the external limit of the retuse front (in the female the middle projection becomes a scarcely prominent and scarcely emarginate gibbosity and there is no external tubercle); the sides of the prothorax are not sinuate in front of the middle; the front angles of the prothorax are obtuse and the hind angles very well defined (not far from being *right* angles); the eyes are quite distinctly granulate.

O. glabratus, Hope. There are several Australian *Onthophagi* that the few words in which this species is described would fit very fairly well. One of them is a species that was sent to me by the late Dr. Bovill from the Port Essington neighbourhood, and therefore I have little doubt of its being the true *glabratus*. The following indication of characters will enable it to be identified: — Long, $4\frac{1}{2}$ l.—$5\frac{1}{2}$ l.; color uniform, varying from red-brown to black, tarsi palpi and antennæ lighter (especially the antennal club, which is somewhat testaceous); upper surface glabrous coriaceous subopaque; head without any transverse carinæ, its surface to about the level of the eyes transversely wrinkled, hinder part scarcely punctulate; pronotum faintly sparsely and excessively finely punctulate, without inequalities

except the sublateral fovea on either side, its base with a very narrow pseudo-margin (as indicated above under *picipennis*, Hope), the sides not sinuate in front of the middle and not strongly sinuate behind the middle; the eyes nitid and smooth (but with underlying granulation visible in some examples); elytra very finely crenulate-striate, striæ somewhat nitid, crenulations very feeble and not wider than the striæ, interstices flat (or nearly so) scarcely punctulate, pygidium and metasternum scarcely punctulate; front of clypeus just perceptibly sinuous in the middle; no sexual distinctions observed (although numerous specimens examined) except that in some examples the front tibiæ are more slender than in others. The only discrepancy with Hope's description is in the colour of the antennal club. Hope calls the antennæ of the type "piceous" in distinction from the general black colour. In reality the club of the antennæ is dull testaceous, but in several specimens before me (and probably it was the case with the type) the club is dirty and looks darker than it really is.

O. australis, Guér. I am doubtful as to whether the common *Onthophagus* that usually bears this name in collections is really this almost undescribed insect. The original description is practically unintelligible unless assisted by comparison with the Indian *O. dama*, Fab., but as its author expressly states that its elytra are black and the elytra of the *Onthophagus* I refer to are always more or less green or coppery, there certainly seems to be a doubt about the identification. Harold published a note in 1867 claiming the name for the common *Onthophagus* to which it is usually attributed, but he gives no reason for his determination, which could not possibly be decisive of the matter unless it was founded on comparison with the type. As, however, I have no means of ascertaining whether the type is still in existence, I accept Harold's identification; though it is to be noted that Guérin says of *australis* "thorace mutico" which does not apply (as Harold himself indicates) to the species for which he claims the name.

O. tweedensis, sp. nov. Mas. Sat latus; supra glaber; subtus fulvo-hirtus; minus nitidus; supra subtiliter coriaceus; viridis, elytris nigris vix violaceis, tarsis palpis antennisque ferrugineis (harum clava testacea), clypeo crebre minus fortiter punctulato, antice late reflexo subtruncato; sutura clypeali minus fortiter carinata; lamina frontali sat alta utrinque ut cornu elongatum sat gracile producta (cornubus apicem versus sat fortiter convergentibus; capite pone clypeum sparsius subfortiter punctulato; oculis angustis fortius granulatis; prothorace quam longiori ut 18 add 11 latiori, supra antice retuso, parte retusa lævi in medio anguste

oblique declivi ultra declivitatem mediam (hic subgibboso et hinc fere verticali), cetera parte sparsim subgrosse nec profunde vix rugulose punctulato, foveis lateralibus magnis profundis, lateribus et ante et pone medium fortiter sinuatis, angulis anticis dentiformibus posticis obtusis, basi anguste subplanata; elytris crenulato-striatis, crenulis haud punctiformibus, interstitiis subconvexis sparsim subtiliter punctulatis; pygidio sparsim subfortiter punctulato; metasterno fere lævi (parte antica externa utrinque sat grosse punctulata excepta); tibiis anticis minus elongatis; unguiculis sat parvis. Long., 4 l.; $2\frac{3}{5}$ l.

Allied to *O. australis*, Guér.; and *O. Mastersi*, Macl. Its green coloring is considerably brighter than in the former and in no part is it so decidedly black as the latter, its black coloring even on the elytra having a manifest indigo tone. The very strong sinuation of the sides of its prothorax in the front half distinguish it quite effectually from *australis*; they are slightly sinuate in *Mastersi*, but that species is entirely black on the upper surface and the crenulæ of its elytral striæ are notably punctiform and wider than their striæ. The horns at the ends of the frontal lamina are much less widely separated *inter se* than in any specimen before me of *australis* or *Mastersi* and are almost approximate at their tips. The inequality of the front of the pronotum is also distinctive; viewed from the side the front outline is seen (not to be evenly declivous, but) to run obliquely declivous for a certain distance, then to project forward in a subangular gibbosity and thence to descend almost vertically. In the type specimen there is a deep emargination of the frontal lamina at either end separating the lamina from the horns (as in most examples of *australis* and *Mastersi)* but this is no doubt variable. This species has been given to me by Mr. Lea.

Northern N.S. Wales (Tweed R.).

O. parvus, Blanch. The description given by Blanchard of this species is too brief to be of much use except supplemented by the examination of specimens obtained in the habitat of the type. I have before me a male *Onthophagus* (unfortunately only a single example) from the Far North of W. Australia which agrees very well with Blanchard's description, and as I have observed that the *Onthophagi* of the P. Essington district are largely represented in N.W. Australia). I have seen very few of them from Queensland), there is every probability that the specimen in question is *parvus*. Raffles Bay,—the habitat of *O. parvus* is close to Port Essington. The following notes furnish more exact particulars than Blanchard supplied:—Long., $3\frac{1}{2}$ l. Black, the margins of the clypeus, the antennæ, the palpi and legs red

Upper surface glabrous and very nitid. Head without any transverse carinæ, the clypeal suture just perceptibly elevated; clypeus scarcely sinuate in the middle of the front, its surface somewhat strongly and closely punctulate and evidently transversely wrinkled; the rest of the head punctured not much differently from the clypeus but gradually less closely hindward and with smaller punctures intermingled; the eyes convex, scarcely granulate and not very narrow; pronotum extremely finely and sparsely punctulate, without inequality except the sublateral foveæ, its base with a fairly distinct pseudo-margin, the sides not sinuate in front of the middle (the right side is very slightly so, but I think this is abnormal) and only feebly sinuate behind, front angles moderately produced, hind angles scarcely defined; elytra somewhat strongly crenulate-striate, the crenulations decidedly punctiform and wider than the striæ, interstices decidedly convex and extremely finely punctulate (a little more distinctly towards the lateral margins); pygidium and metasternum strongly punctulate, claws like those of *O. Kingi*, Har. The under-surface is almost glabrous, but this may be due to abrasion. A specimen in the S. Australian Museum examined since the above note was written seems to be the female of this species. It differs from the male chiefly by its strongly cariniform clypeal suture.

O. queenslandicus, sp. nov. Minus latus; supra glaber; subtus sparsissime hirtus; subnitidus, piceus vel niger, antennis palpisque testaceis, tarsis (tibiisque plus minusve) rufescentibus; clypeo sat fortiter subrugulose punctulato et transversim rugato antice rotundato vel vix sinuato, sutura clypeali carinata, carina frontali bene definita antrorsum arcuata; capite inter carinas subgrosse (pone carinam frontalem multo magis subtiliter) punctulato; oculis convexis, minus angustis, vix perspicue granulatis; prothorace quam longiori ut 18 ad 11 latiori, supra æquali (foveis sublateralibus exceptis), subtilius sat crebre (latera versus antice magis crebre) punctulato, lateribus ante medium haud (pone medium leviter) sinuatis, angulis anticis subacutis posticis fere nullis, basi angustissime subplanata; elytris sat leviter (nec angustissime) crenulato-striatis, interstitiis leviter vel vix convexis, subtiliter coriaceis leviter subtilissime sparsim (latera versus paullo magis perspicue) punctulatis; pygidio coriaceo sat crebre minus subtiliter punctulato; metasterno nitido subtiliter punctulato.

Maris quam feminæ tibiis anticis longioribus. Long., $3\frac{1}{2}$ l.; lat., $1\frac{9}{10}$ l.

The flattened narrow strip across the base of the pronotum is carcely noticeable except when looked at obliquely from behind,

but from that point of view is very manifest, especially in the middle. The species is very distinct from any other known to me. From those species which it most resembles superficially its strongly bicarinate head in combination with non-metallic surface separate it widely.

N. Queensland (sent by the late Mr. Cowley).

O. fitzroyensis, sp. nov. Mas. Sat latus; supra glaber; subtus sparsissime fulvo-hirtus; minus nitidus, subtiliter coriaceus; piceus vel niger, leviter vel vix æneescens, tarsis palpis antennisque ferrugineis, harum clava testacea; clypeo sat fortiter punctulato, antice rotundato; sutura clypeali leviter carinata, capite pone clypeum sparsius subtilius punctulato et inter oculos bicornuto; oculis sat angustis, leviter convexis, vix manifeste granulatis; prothorace quam longiori ut 17 ad 11 latiori, supra crebrius subtilissime punctulato, antice a medio oblique concavo-retuso, supra partem retusam in medio vix gibbo, utrinque latus versus foveolato, lateribus ante medium haud (pone medium subfortiter) sinuatis; angulis anticis subacutis posticis rotundato-obtusis; basi angustissime subplanata; elytris crenulato-striatis, crenulis vix punctiformibus quam striæ vix latioribus, interstitiis crebrius subobsolete punctulatis: pygidio sparsim obsolete (metasterno sparsim subtiliter, latera versus sparsim grosse) punctulato; pedibus anticis minus elongatis; tarsorum posticorum articulo apicali subtus breviter acuminato-producto, unguiculis sat magnis, fortiter curvatis.

Femina (?) quam mas magis opaca, clypeo antice leviter subsinuato; capite pone clypeum magis crebre punctulato, inermi; pronoto antice vix perspicue retuso, in medio etiam minus gibbo, vix perspicue punctulato; elytris minus fortiter striatis, interstitiis planis. Long, $3\frac{1}{2}$ l.; lat., $2\frac{1}{5}$ l.

The male described above and the insect described doubtfully as its female are in the S. Australian Museum among the relics of the ill-fated Calvert exploring expedition in N.W. Australia. The two were taken at the junction of the Fitzroy and Margaret Rivers, apparently in company. I have no *serious* doubt of their being one species, but it is to be noted that I know no other Australian *Onthophagus* in which the front of the pronotum is strongly retuse in the male and all but absolutely non-retuse in the female. The species is near *O. Kingi*, Har., which, *inter alia*, is considerably larger, is devoid of coarse puncturation on the metasternum, and has much wider eyes. *O. queenslandicus* is another ally, but *inter alia*, its head is quite strongly bicarinate.

N.W. Australia.

O. aureo-viridanus, sp. nov. Sat latus; totus fulvo-pilosus; nitidus; aureo-viridis, elytris corporeque subtus obscuris, palpis tarsisque ferrugineis, antennis piceis; clypeo crebre ruguloso, antice subemarginato; sutura clypeali subobsoleta sed in medio ut cornu breve conicum erecto; carina frontali angulata, leviter elevata, nonnihil cuprea; capite inter clypeum et carinam frontalem sat grosse punctulato; oculis angustis fere subfortiter granulatis; prothorace quam longiori ut 16 ad 11 latiori supra sparsius (ad latera magis crebre) subgrosse punctulato, æquali (foveis lateralibus exceptis), lateribus ante medium haud (pone medium leviter) sinuatis, angulis anticis obtusis posticis fere nullis, basi subtiliter elevato-marginata; elytris fortiter striatis, striis latis confuse punctulatis, interstitiis convexis lævibus (sed prope marginem lateralem fortiter) punctulatis; pygidio metasternoque fortiter crebrius punctulatis; unguiculis parvis. Long., 2⅔ l.; lat., 1⅔ l.

I have seen four specimens of this iasect and do not observe any sexual distinctions among them except that one of them (no doubt a male) has front tibæ more slender than the others. The species is not near any other Australian *Onthophagus* known to me except *geelongensis*, Blackb., from which it differs *inter alia* by its colour, by its clypeal suture obsolete except in the middle where it becomes a short conical horn; and by its pronotum very evidently more coarsely and less closely punctulate, and edged along its base by a fine raised line which is quite well defined in the middle.

South Australia.

O. Macleayi, sp. nov. Minus latus; supra pilis erectis flavescentibus sparsim vestitus; subtus fulvo-hirtus; subnitidus, elytris pygidioque subtiliter coriaceis; rufo-brunneus, antennarum clava dilutiori; capite æquali, rugulose sat grosse nec crebre punctulato, antice sat fortiter sat anguste reflexo et sat profunde emarginato; oculis minus angustis haud perspicue granulatis; prothorace fere æquali (antice vix retuso et vix bigibbo postice late longitudinaliter vix sulcato) foveis sublateralibus exceptis, sparsius subfortiter (prope angulos anticos sat grosse) punctulato, angulis anticis obtuso-rotundatis posticis sat definitis obtusis, lateribus ante medium haud (pone medium leviter) sinuatis, basi subfortiter elevato-marginata leviter trisinuata; elytris sat fortiter striatis, striis leviter punctulatis, puncturis in striis quam striæ latioribus, insterstitiis convexis nonnihil cariniformibus sparsim leviter fere grosse punctulatis, puncturis in interstitiis piliferis; pygidio metasternoque sat grosse punctulatis

(puncturis in ambobus piliferis); tibiis anticis minus elongatis, unguiculis parvis. Long., 4 l.; lat., 2¼ l.

The type of this species (which was generously given to me by Mr. Lea) is probably a male, judged by the narrowed and quite strongly upturned front of its head. The clypeus is evenly continuous with the rest of the head without any trace of a clypeal suture or carina or any change in the puncturation. Probably this species bears a general resemblance to the practically undescribed *O. Thoreyi*, Har., but as the presence of a frontal carina in both sexes is one of the few characters attributed to that species I presume that it is distinct. This insect is also somewhat like superficially to an *Onthophagus* from N. Australia which I have no doubt is *O. latro*, Har., which, however, among many other distinctions has the base of its pronotum unmargined and its eyes quite distinctly granulate. I have named it after the late Sir W. Macleay.

N.S. Wales; Sydney.

O. Helmsi, sp. nov. Mas (?). Sat latus; supra glaber; subtus sparsissime fulvo-hirtus; sat nitidus; niger, tarsis palpis antennisque ferrugineis; clypeo transversim rugato, antice leviter emarginato; sutura clypeali fortiter carinata; capite pone clypeum sat grosse punctulato et inter oculos obtuse bituberculato; oculis minus angustis vix perspicue granulatis; prothorace quam longiori ut 18 ad 11 latiori, supra antice vix perspicue retuso (foveis sublateralibus modicis), crebre minus fortiter punctulato (parte sublaterali media lævi), postice longitudinaliter vix sulcato, lateribus ante medium haud (pone medium leviter) sinuatis, angulis anticis fere rectis posticis obtusis, basi subtilissime (nisi in medio vix perspicue) elevato-marginata, elytris punctulato-striatis, puncturis quam striæ sat latioribus, interstitiis convexis crebrius minus subtiliter punctulatis; pygidio crebre sat grosse punctulato; metasterno (media parte lævi excepta) sat grosse punctulato; tibiis anticis modicis; unguiculis minus brevibus. Long. 2½ l.; lat., 1⅔ l.

I am doubtful of the sex of the unique example of this species (presented to me by Mr. Lea). The two frontal tubercles and the tendency (very slight) to a retuse form on the front of the pronotum are in favour of its being a male, but the front tibiæ do not show any elongation likely to be sexual. It is superficially not unlike *O. nitidior*, Blackb., but *inter alia* has much wider eyes, which are scarcely perceptibly granulate. It also resembles *O. Koebelei*, Blackb. (which has similar eyes) but differs by *inter alia* its convex conspicuously punctulate elytral interstices and

its very much more closely punctulate pygidium which (unless the type is abraded) is non-setose.

N.W. Australia (Kimberley; Mr. Helms).

O. Koebelei, sp. nov. Sat latus; supra glaber subtus fulvo-hirtus; nitidus; niger, clypei margine pedibusque piceis, antennis testaceis, pygidio rufo; clypeo perbrevi, fortiter crebre punctulato, vix transversim rugato, antice vix sinuato, sutura clypeali sat fortiter carinata antrorsum sat fortiter arcuata, carina frontali sat fortiter elevata; capite inter carinas sat fortiter minus crebre (pone carinam frontalem minus fortiter subsparsim) punctulato; oculis sat convexis minus angustis, vix perspicue granulatis; prothorace quam longiori ut 9 ad 5 latiori, supra æquali (foveis sublateralibus subobsoletis exceptis) subtiliter sparsim (latera versus magis fortiter vix magis crebre) punctulato, lateribus (his minus fortiter arcuatis) ante medium haud (pone medium vix) sinuatis, angulis anticis obtusis minus productis posticis late obtusis, basi media subtiliter elevato-marginata; elytris punctulato-striatis, striis sat subtilibus, puncturis quam striæ sat latioribus, interstitiis subplanis subtilissime (prope marginem lateralem fortiter) punctulatis; pygidio sparsim setoso, fortiter sparsius punctulato; metasterno (medio late lævi excepto) grosse punctulato. Long., 2 l.; lat., $1\frac{1}{4}$ l.

I am doubtful of the sex of my unique specimen; the front tibiæ are moderately short and stout, but it is probably a species in which the sexes do not differ much *inter se*. There is a little tendency to rufescence about the base and apex of the elytra which is probably not constant. The basal margin of the pronotum is an extremely fine line scarcely distinct except in the middle, but the pronotum certainly cannot be called unmargined at the base. The very feebly rounded sides of the pronotum furnish a good character.

N. Queensland (Mr. Koebele).

O. pontilis, sp. nov. (Mas.?) Sat latus; supra glaber; subtus sparsim fulvo-hirtus; nitidus; obscure æneus, pronoto nonnihil aurato, antennis pedibusque ferrugineis, elytris (exempli typici) prope apicem testaceo-variegatis; clypeo perbrevi, fortiter crebre punctulato, transversim rugato, antice sat fortiter emarginato, sutura clypeali sat fortiter carinata antrorsum sat fortiter arcuata, carina frontali nulla sed fronte media tuberculo magno acute conico armata; capite pone carinam clypealem fortiter sat crebre (postice minus crebre) punctulato; oculis angustis vix convexis minus subtiliter granulatis; prothorace quam longiori ut 7 ad 4 latiori, supra fere æquali (foveis sublateralibus et sulco obso-

leto longitudinali brevi postico exceptis), antice vix perspicue retuso, subfortiter (antrorsum a basi gradatim magis subtiliter, latera versus magis grosse) punctulato, lateribus ante medium haud (pone medium vix) sinuatis, angulis anticis obtusis minus productis posticis fere nullis, basi anguste sat fortiter elevato-marginata; elytris minus anguste crenulato-striatis, stria subsuturali profunde (ceteris leviter) impressis, interstitiis subtilissime coriaceis subplanis subfortiter (latera versus subgrosse rugulose) sat crebre punctulatis; pygidio coriaceo leviter punctulato; metasterno medio subtilius (latera versus sat grosse) punctulato; tibiis anticis minus elongatis, sat latis. Long., $2\frac{1}{4}$ l.; lat. $1\frac{2}{3}$ l.

Closely allied to *O. blackwoodensis*, Blackb., but differing from it *inter alia* by its conspicuously brassy tone of colour (almost golden on the pronotum), the clypeal carina very strongly arched (its convexity forward, and causing the clypeus to be extremely short), the pronotum considerably less strongly punctulate and with its sides all but non-sinuate behind the middle, and the elytral interstices nearly flat. The forehead with a median conical tubercle (or short horn) in the male in combination with the pronotum margined on its base by a rather strong raised edging and small size will separate this species from the other described Australian *Onthophagi*.

S. Australia; Murray Bridge.

O. Tamworthi, sp. nov. Sat latus; supra glaber; subtus sparsim fulvo-hirtus; minus nitidus, coriaceus; obscure viridis, tarsis antennisque ferrugineis (harum clava nigricanti); clypeo crebre sat grosse ruguloso-punctulato, antice leviter emarginato; sutura clypeali fortiter carinata fere recta; carina frontali sat fortiter elevata antrorsum leviter arcuata; capite inter carinas crebre sat grosse subrugulose punctulato; oculis angustis sat planis minus subtiliter granulatis; prothorace quam longiori ut 18 ad 11 latiori, supra crebre fortiter punctulato, postice longitudinaliter manifeste canaliculato, antice breviter retuso, supra partem retusam obtuse transversim carinato, utrinque prope latera foveolato, lateribus ante medium haud (pone medium manifeste) sinuatis, angulis anticis sat obtusis minus productis posticis sat rotundatis, basi vix perspicue (in medio sat manifeste) elevato-marginata; elytris subtiliter nitide crenulato-striatis, interstitiis convexis, his cum striis irregulariter minus crebre fere subgrosse sparsim (latera versus magis crebre) punctulatis; pygidio metasternoque sat grosse punctulatis.

Maris quam feminæ tibiis anticis manifeste magis elongatis. Long., $3\frac{1}{4}$ l.; lat., 2 l.

A very distinct species, recalling to mind by its general appearance the species referred to above under *O. australis*, Guér., but with the base of its pronotum very differently margined, the frontal carina of its male not elevated at the ends, the club of its antennæ dark, its size much less, &c., &c.

N.S. Wales (Tamworth); Mr. Lea.

O. Frenchi, sp. nov. Sat latus; supra glaber; subtus sparsim fulvo-hirtus; minus nitidus, subtiliter coriaceus; æneus, nonnihil cuprascens, tarsis palpis antennisque ferrugineis (harum clava nigricanti); clypeo ut *O. Tamworthi*, Blackb., sutura clypeali (maris leviter, feminæ sat fortiter) carinata, carina frontali sat elevata (maris retrorsum arcuata, feminæ recta); capite inter carinas ut clypeus sculpturato; oculis ut *O. Tamworthi*; prothorace quam longiori ut 18 ad 11 latiori, supra crebre sat fortiter punctulato, supra æquali (foveis sublateralibus et canali longitudinali postice minus perspicuo exceptis), lateribus ante medium haud (pone medium vix manifeste) sinuatis, angulis anticis vix obtusis leviter subproductis posticis fere nullis, basi vix perspicue (in medio sat manifeste) elevato-marginata; elytris subtiliter nitide crenulato-striatis, interstitiis convexis subtilius sat crebre (latera versus magis fortiter) punctulatis; pygidio metasternoque fortiter nec crebre punctulatis.

Maris quam feminæ tibiis anticis manifeste magis elongatis. Long., 3 l.; lat., $1\frac{9}{10}$ l.

Not unlike the preceding but readily distinguished from it by, *inter alia*, its pronotum not transversely carinate.

N.S. Wales (Queanbeyan); Mr. Lea.

O. henleyensis, Black. The differences between this species and that which I have no doubt is *jubatus*, Har., are very considerable but do not lend themselves readily to tabulation on account of the great difference between the sexes of the latter. In *henleyensis* the pronotum is in both sexes very evidently coarser than in female *jubatus*, very much coarser than in male *jubatus*; both sexes are nitid,—the male of *jubatus* opaque; the pronotum is pilose in front only in the male—in *jubatus* in both sexes. The frontal horns in numerous examples of male *henleyensis* are in their greatest development short stout conical and divergent,—in the single male of *jubatus* examined they are long slender and arched. On the whole the males of the two species are not much like each other, while the females bear considerable resemblance *inter se*.

O. victoriensis, sp. nov. Sat latus; supra glaber; subtus fulvo-hirtus; subnitidus, elytris subtilissime coriaceis; niger; clypeo grosse crebre subrugulose punctulato, antice sat

fortiter emarginato utrinque subdentiformi; sutura clypeali fortiter (præcipue in medio) carinata, utrinque abbreviata; carina frontali sat fortiter elevata fere recta; capite inter carinas grosse minus crebre punctulato; oculis sat angustis, leviter convexis, perspicue granulatis; prothorace quam longiori ut 8 ad 5 latiori, sat crebre sat grosse (antice minus grosse) punctulato, postice longitudinaliter manifeste canaliculato, utrinque foveolato, antice vix retuso, lateribus ante medium haud (pone medium modice) sinuatis, angulis anticis subacutis parum productis posticis fere nullis, basi sat fortiter elevato-marginata; elytris sat fortiter crenulato-striatis, crenulis latera versus subpunctiformibus, interstitiis convexis sparsim minus subtiliter punctulatis; pygidio (hoc coriaceo) metasternoque fortiter punctulatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{7}{10}$ l.

I am doubtful of the sex of my unique example of this species, which belongs to a group in which there is usually very little external difference between the sexes,—but the front tibiæ being decidedly broad I suspect it is a female. It is near *O. henleyensis*, Blackb.; but that species has elytra non-coriaceous and very much more rugulose, and considerably narrower eyes.

Victoria; I am uncertain of the exact habitat.

O. submuticus, sp. nov. Sat latus; supra glaber; subtus sparsim fulvo-hirtus; pernitidus; niger, tarsis palpis antennisque (harum clava testacea) ferrugineis; clypeo transversim ruguloso, antice vix sinuato; sutura clypeali integra, leviter carinata; carina frontali nulla; capite pone clypeum sparsim subtiliter punctulato; oculis minus angustis, leviter convexis, nitidis, vix perspicue granulatis; prothorace quam longiori ut 18 ad 11 latiori, sparsim subtilissime nec obsolete punctulato, postice longitudinaliter haud canaliculato, æquali (foveolis sublateralibus exceptis), lateribus (his fortiter rotundatis) ante medium haud (pone medium minus fortiter) sinuatis, angulis anticis subacutis posticis late obtusis, basi nullo modo marginata; elytris punctulato-striatis, puncturis quam striæ multo latioribus parum profundis, interstitiis sat planis, subtilius sat crebre punctulatis; pygidio crebre subtilius (metasterno sparsim fortiter) punctulato. Long., $3\frac{4}{5}$ l.; lat., $2\frac{1}{5}$ l.

Allied to *O. muticus*, Macl., and *inermis*, Macl. This species differs from the insect which I believe to be the former *inter alia* by its sparsely and strongly punctulate metasternum; from that which I take to be *inermis* by, *inter alia*, its still more polished surface and its elytral interstices very conspicuously punctulate. The sides of the prothorax are much more strongly rounded than in any specimen that I have seen of either of the species just

mentioned. I am doubtful as to the sex of my unique example of *submuticus*, but as the external teeth of the front tibiæ are fairly strong and the clypeal suture is distinctly carinate I deem it probably a female.

N. Queensland.

O. muticus, Macl. This species together with *inermis*, Macl., and *submuticus*, Blackb., form a small group closely allied *inter se* and without any other close allies so far as I know. Their surface is black, decidedly (or very) nitid, the pronotum without any trace of basal margin and not (or excessively finely) punctulate, the head without frontal carina (but slightly prominent close to the inner margin of the eyes) and with the clypeal suture non-carinate (male) or slightly carinate (female), the front tibiæ about the same length in the sexes but more strongly toothed externally in the female than in the male, the clypeus not (or scarcely) sinuate in front. I am not sure that I know both sexes of any member of the group except *muticus*, but I do not feel any doubt of the sexes unknown to me confirming the above information. I think I know only the male of *inermis* and the female of *submuticus*, and it is perhaps just possible that *submuticus* may be the female of *inermis*, but I think it most unlikely, owing to the very much more strongly rounded sides of the prothorax in the former. In *muticus* the female pronotum and elytra are just perceptibly punctulate (those of the male not perceptibly) but there is no such difference as there would be in this respect between the male and female of *inermis* if my *submuticus* were the female of that species. The metasternum of the species that I identify with *muticus* is closely and finely punctulate.

O. inermis, Macl. The only specimen I have seen that I can refer to this species is in the collection of Mr. Lea. It is evidently a male. It agrees with Macleay's very brief description; and also with his note of difference from *muticus*, Macl., in being "smaller, more brilliant, smoother on the thorax and more deeply striated on the elytra." It also differs from the insect mentioned above as *muticus* in having the puncturation of its metasternum sparse and strong,—a character not mentioned by its author.

O. Comperei, sp. nov. Sat latus; supra glaber; subtus sparsim fulvo-hirtus; minus nitidus, subtiliter coriaceus; niger, tarsis palpis antennisque (harum clava testacea) ferrugineis; clypeo antice emarginato, sutura clypeali sat fortiter carinata; carina frontali fere nulla, capite inter oculos utrinque tuberculo sat magno armato, inter carinas subgrosse nec profunde punctato; oculis minus angustis, sat convexis, perspicue sat obsolete granulatis; prothorace quam

longiori ut 18 ad 11 latiori, crebre minus subtiliter punctulato, postice longitudinaliter vix manifeste canaliculato, lateribus ante medium haud (pone medium leviter) sinuatis, angulis anticis subacutis posticis fere nullis, basi nullo modo marginata; elytris sat fortiter crenulato-striatis (crenulis certo adspectu punctiformibus quam striæ latioribus), interstitiis convexis sparsius subtiliter perspicue punctulatis; pygidio sparsim obsolete (metasterno sat grosse puncturis nonnullis minoribus intermixtis) punctulato.

Maris clypeo antice fortiter emarginato utrinque subdentiformi, tuberculis frontalibus conicis, tibiis anticis nonnihil elongatis, pronoto antice plus minusve retuso.

Feminæ clypeo antice leviter emarginato haud dentiformi, tuberculis frontalibus obtusis, tibiis anticis sat brevibus, elytris magis opacis, pronoto (foveolis lateralibus exceptis) æquali. Long., 3 l.; lat., $1\frac{4}{5}$ l.

I have named this species after Mr. G. Compere, of W. Australia, who is rendering very valuable service in his investigations of insect parasites.

N.B.—Since writing the above description I have seen male examples in the collection of Mr. Griffith (which I hesitate to separate from this species) evidently more nitid than the type and having the frontal tubercles prolonged into considerable horns and the front of the pronotum quite strongly retuse.

N. Queensland.

O. sydneyensis, sp. nov. Sat latus; supra glaber; subtus sparsim fulvo-hirtus; nitidus; niger, palpis tarsis et antennarum basi ferrugineis; oculis angustis subfortiter granulatis; clypeo antice sinuato; prothorace quam longiori ut 18 ad 11 latiori, supra subtilius sat crebre punctulato, antice retuso, utrinque foveolato, lateribus ante medium haud (pone medium vix) sinuatis, angulis anticis sat obtusis posticis fere nullis, basi nullo modo marginata; elytris punctulato-striatis, puncturis quam striæ sat latioribus, interstitiis sat planis crebrius subtilius punctulatis; pygidio crebrius subtilius (metasterno sparsim subtiliter,—pone coxas intermedias sparsissime subfortiter) punctulatis.

Maris capite fere lævi inter oculos bicorni; pronoto antice fortiter retusa, obsolete punctulato; tibiis anticis paullo elongatis.

Feminæ clypeo sat fortiter ruguloso, sutura clypeali carinata, capite pone clypeum sparsim punctulato et bituberculato, pronoto antice brevissime retuso, tibiis anticis sat brevibus. Long., $2\frac{1}{4}$ l.; lat. $1\frac{2}{3}$ l.

Near *mutatus*, Har., but *inter alia* without the least trace of a basal margin to the pronotum; the head of the male without any clypeal carina or distinct puncturation, &c.

N.S. Wales; Sydney (Mr. Lea).

O. Dumbrelli, sp. nov. Mas (?). Sat latus; supra (pygidio setoso excepto) glaber; subtus fulvo-hirtus; sat nitidus; niger, tarsis palpis antennisque (harum clava dilutiori) ferrugineis; clypeo transversim ruguloso-punctulato, antice vix sinuato; sutura clypeali sat fortiter carinata utrinque abbreviata; carina frontali sat elevata; capite inter carinas subtilius nec crebre punctulato; oculis angustis sat aspere granulatis; prothorace quam longiori ut 18 ad 11 latiori, supra antice crebrius fortius (basin lateraque versus magis sparsim magis subtiliter) punctulato, postice longitudinaliter sulcato, antice perspicue retuso (parte retusa media antrorsum perspicue sat late gibbosa), foveis sublateralibus sat profundis, lateribus ante medium vix (pone medium fortius) sinuatis angulis anticis sat acutis posticis obtusis, basi haud marginata; elytris punctulato-striatis, puncturis in striis quam striæ sat latioribus, interstitiis subconvexis subtilissime coriaceis subtiliter minus, crebre (latera versus minus subtiliter) punctulatis; pygidio coriaceo sparsim leviter (metasterno sparsim subtilius, antice subgrosse) punctulato; tibiis anticis leviter elongatis; unguiculis sat parvis. Long., $2\frac{3}{4}$ l.; lat., $1\frac{3}{8}$ l.

A small inconspicuous species resembling *O. Fletcheri*, Blackb., and *O. sydneyensis*, Blackb., and differing *inter alia* from the former by its clypeus not emarginate in front and the testaceous club of its antennæ, from the latter by its pronotum longitudinally sulcate (except near the front) and differently punctulate. Also resembles some species of Group V. (e.g. *O. Helmsi*, Blackb., which has the metasternum very differently sculptured, &c.). Taken at Galston by Messrs. Lea and Dumbrell; given to me by the former.

N.S. Wales.

O. negatorius, sp. nov. Fem. (?). Sat latus; supra glaber; subtus fulvo-hirtus; sat nitidus; niger leviter ænescens, tarsis palpis antennarumque basi subferrugineis; clypeo transversim ruguloso, antice emarginato; sutura clypeali sat fortiter carinata; carina frontali sat obsoleta arcuata et sinuata vix continua; capite toto pone clypeum sat æqualiter sat grosse punctulato; prothorace quam longiori fere ut 18 ad 11 latiori, supra sat æquali, sat crebre minus subtiliter punctulato, versus latera vix foveolato sed tuberculo obtuso lævi instructo, lateribus ante medium haud (pone medium sat

fortiter) sinuatis, angulis anticis fere rectis posticis obtusis, basi haud marginata; elytris crenulato-striatis, totis crebre inæqualiter minus subtiliter punctulatis, interstitiis subconvexis inæqualiter (subtiliter et subtilissime) coriaceis (sicut partes nonnullæ magis nitidæ videntur); pygidio fortiter sat crebre (metasterno sparsim subtilius) punctulato; tibiis anticis sat brevibus; unguiculis parvis. Long., $1\frac{4}{5}$ l.; lat., $1\frac{1}{10}$ l.

This very small *Onthophagus* was given to me by Mr. Lea. From its immediate allies it differs as follows, *inter alia*:—From *Dumbrelli*, Blackb., by the dark club of its antennæ; from *sydneyensis*, Blackb., and *Fletcheri*, Blackb., by the close strong puncturation of its elytral interstices. It also resembles some species of Group V. If its pronotum were margined at the base it would fall in the tabulation beside *O. henleyensis*, Blackb., and *jubatus*, Har., differing from both (female) by the very much finer puncturation of its pronotum. It has much superficial resemblance to the female of *O. nitidior*, Blackb., from which (disregarding the unmargined base of its pronotum) it differs by the strongly sinuous and scarcely distinct carina of its pronotum as well as by the much more close and confused puncturation of its elytral interstices, &c. The irregular puncturation and the uneven coriaceousness of its elytra give the interstices a somewhat rugulose appearance,—the more nitid part seeming to be unevenly prominent.

W. Australia (Donnybrook).

O. Fletcheri, sp. nov. Sat latus; supra pilis subtilibus erectis vestitus; subtus fulvo-hirtus; nitidus (maris elytris minus nitidis, subtiliter coriaceis); niger, tarsis palpis et antennarum basi ferrugineis; clypeo antice emarginato, rugulose punctulato; sutura clypeali sat fortiter carinata; carina frontali sat elevata, antrorsum arcuata; capite inter carinas fortiter punctulato; oculis angustis, minus convexis, perspicue granulatis; prothorace quam longiori ut 16 ad 11 latiori, crebre fortiter punctulato, æquali (foveolis sublateralibus exceptis), lateribus ante medium haud (pone medium sat perspicue) sinuatis, angulis anticis subobtusis parum productis posticis late obtusis, basi nullo modo marginata; elytris sat fortiter punctulato-striatis, puncturis quam striæ sat latioribus, interstitiis fere planis sparsim subtilius (prope latera grosse) punctulatis; pygidio fortiter crebrius (metasterno sparsius grosse) punctulato.

Maris clypeo antice leviter emarginato; carina frontali antrorsum arcuata, elytris pygidioque subtiliter coriaceis, tibiis anticis sat elongatis sat angustis.

Feminæ clypeo antice fortiter emarginato, carina frontali sat recta, elytris pygidioque haud coriaceis, tibiis anticis sat brevibus sat latis. Long., $2\frac{1}{4}$—3 l.; lat., $1\frac{3}{10}$—$1\frac{4}{5}$ l.

The erect pilosity is long on the head and along the front margin of the pronotum, scarcely marked on the general surface of the pronotum, somewhat short (but very well marked) on the elytra and pygidium; the prothorax is rather elongate as compared with that of most *Onthophagi*.

N.S. Wales; Inverell (Mr. Fletcher).

O. subocelliger, sp. nov. Modice latus; supra glaber; subtus fulvo-hirtus; minus nitidus, elytris subtiliter coriaceis; obscure cuprascens, tarsis palpis antennisque ferrugineis (harum clava obscura); clypeo antice sat fortiter emarginato; oculis perangustis perspicue asperatim granulatis; prothorace quam longiori ut 17 ad 11 latiori, supra confertim subfortiter subocellatim punctulato, æquali (foveolis sublateribus sat obsoletis exceptis), lateribus ante medium haud (pone medium leviter) sinuatis, angulis anticis sat obtusis posticis minus distinctis, basi nullo modo marginata; elytris sat subtiliter crenulato-striatis, crenulis quam striæ haud latioribus, interstitiis sat fortiter convexis obsolete subrugulose haud seriatim (prope latera paullo magis fortiter) punctulatis; pygidio metasternoque sat grosse punctulatis, hoc in media parte fere lævi, unguiculis parvis.

Maris capite fere lævi vel subtilissime sparsim punctulato; carina frontali sat elevata utrinque perspicue sursum producta; tibiis anticis modice elongatis.

Feminæ capite sat crebre subfortiter punctulato; sutura clypeali sat fortiter carinata; carina frontali minus elevata; tibiis anticis sat brevibus. Long., 2 l.; lat., $1\frac{1}{4}$ l.

This species is probably near *O. ocelliger*, Har., but differs from the description of that species, *inter alia*, by its upper surface devoid of setæ (I have examined numerous specimens) and the interstices of its elytra uniformly convex. The sexual characters of the head are very variable, the frontal carina of the male being in some examples very feeble and scarcely elevated at its ends and one male having the clypeal suture evidently carinate.

Northern Territory of S. Australia.

O. margaretensis, sp nov. Modice latus; elytris pygidioque setis subtilibus erectis flavis sparsim vestitis; subtus flavo-hirtus; nitidus; rufo-brunneus, capite postice pronotoque læte viridibus, metasterno æneo, antennarum clava testacea; clypeo transversim rugato, antice sat fortiter emarginato; sutura clypeali sat fortiter carinata; carina frontali modice elevata, recta; capite inter carinas crebrius sat fortiter

punctulato; oculis angustis perspicue granulatis; prothorace quam longiori ut 18 ad 11 latiori, supra antice oblique retuso, supra partem retusam obsolete trigibbo, hac grosse punctulato, cetera parte crebrius subtiliter punctulata, lateribus ante medium haud (pone medium sat fortiter) sinuatis, angulis anticis sat obtusis posticis late obtusis, foveis lateralibus sat profundis, basi haud marginata; elytris fortius striatis striis leviter punctulatis (puncturis quam striæ latioribus), interstitiis convexis sparsim inæqualiter (hic et illic sat grosse) punctulatis; pygidio et metasterni lateribus grosse punctulatis; tibiis anticis sat brevibus; unguiculis posterioribus modicis. Long., 3 l.; lat., $1\frac{4}{5}$ l.

I am not certain as to the sex of the unique example of this insect. The extremely deep coarse puncturation of the retuse part of the pronotum in strong contrast to the fine puncturation of the rest of the surface is a very unusual character. The type is in the S. Australian Museum among the relics of the Calvert Expedition and was taken on the Margaret River.

N.W. Australia.

Tabulation of the characters (as indicated in their descriptions) of the Australian ONTHOPHAGI not examined by the author of this memoir, followed by notes on those species :—

A. Dorsal surface pilose or setose
  B. Elytra unicolorous.
    C. Size very large (9 l.) ... ... rupicapra, *Waterh.*
    CC. Size much smaller.
      D. Front of clypeus emarginate.
        E. Front of pronotum retuse, the retuse front topped by a transverse carina perpilosus, *Macl.*
        EE. Front of pronotum retuse, the retuse front topped by a flattened protuberance ... ... villosus, *Macl.*
        EEE. Front of pronotum even ... incanus, *Macl.*, and ocelliger, *Har.*
      DD. Front of clypeus not emarginate.
        E. Male with a frontal lamina and two horns on the head ... ... Thoreyi, *Har.*
        EE. Male with the frontal elevation a mere carina ... ... vilis, *Har.*
  BB. Elytra bicolorous ... ... rubicundulus, *Macl.*
AA. Dorsal surface glabrous.
  B. Dorsal surface without red or testaceous markings.
    C. Pronotum not punctulate.
      D. Dorsal surface entirely black (male with two contiguous frontal horns) ... furcaticeps, *Macl.*
      DD. Head and pronotum metallic greenish (pronotum retuse and tuberculate in front) ... ... Froggatti, *Macl.*, and lobicollis, *Macl.*
    CC. Pronotum punctulate.
      D. Front of pronotum retuse.
        E. Dorsal surface non-metallic.

F. Pronotum very finely punctulate ... { acuticeps, *Macl.*, and propinquus, *Macl.*

FF. Pronotum coarsely punctulate.

G. Size large (Long, 6 l.); front of clypeus emarginate ... fissiceps, *Macl.*

GG. Size much smaller (Long., 3¼ l.); front of clypeus not emarginate ... ... salebrosus, *Macl.*

EE Dorsal surface more or less metallic.

F. Retuse front of pronotum quadrituberculate (male with a single frontal horn) ... ... Crotchi, *Har.*

FF. Retuse front of pronotum not quadrituberculate.

G. Size comparatively large (Long., 4¼ l.) ... . lucidicollis, *Bohem.*

GG. Size much smaller (Long.. 2¾ l.) purpureicollis, *Macl.*

DD. Front of pronotum not retuse.

E. Dorsal surface non-metallic .. parallelicornis, *Macl.*

EE. Dorsal surface more or less metallic.

F. Elytral interstices opaque .. evanidus, *Har.*

FF. Elytral interstices notably more nitid.

G. Alternate interstices of elytra convex ... ... planicollis, *Har.*

GG. Interstices of elytra equal *inter se.*

H. Pronotum coarsely punctulate granum, *Lansb.*

HH. Pronotum finely punctulate viridiobscurus, *Blanch.*

BB. Dorsal surface with red or testaceous markings.

C. Pronotum bicolorous ... ... rubescens, *Macl.*

CC. Pronotum unicolorous.

D. A conspicuous black fascia on the red elytra ... ... minusculus, *Macl.*

DD. Shoulders, sides, and an apical spot on elytra red ... ... Fabricii, *Waterh.*

DDD. Elytra with only the shoulders red humeralis, *Macl.*

DDDD. Obscure reddish spots about shoulders and apex only.

E Male with a frontal lamina and horns emarginatus, *Macl.*

EE. No strongly raised frontal prominence in either sex ... ... incornutus, *Macl.*

N.B.—I am unable to place *O. tabellicornis*, Macl., and *O. integriceps*, Macl., even in *this* tabulation.

O. rupicapra, Waterh. A very large species from W. Australia; the elytra clothed with setæ, the male with two disconnected frontal horns. I have seen nothing like it.

O. perpilosus, Macl. A small black species from Queensland, densely pilose on the upper surface; interstices of elytra costiform, the under surface also villose. I have not seen any species resembling it.

O. incanus, Macl. A small species from far North of W. Australia; bronzy black, coarsely punctulate and densely clothed with erect grey pubescence. Very distinct from all the species before me

O. vilis, Har., a small species from Somerset (Cape York); the elytra clothed with yellowish pubescence, the head and prothorax coppery, elytra black, nitid. Certainly unknown to me.

O. villosus, Macl. A small species from the far North of W. Australia, clothed above with ashy villosity, the colour black, the pronotum retuse and with a median projection in front. I have seen nothing like it.

O. ocelliger, Har. A small species from Somerset (Cape York); referred to under the heading *O. subocelliger*.

O. rubicundulus, Macl. A very small species from Queensland; unknown to me; seems to be near *O. asper* but *inter alia* differing by its flat elytral interstices.

O. Thoreyi, Har. Quite insufficiently described; probably near *O. Macleayi*, Blackb., but with sexual characters extremely different, whichever sex the type of *O. Macleayi* may be.

O. tabellicornis, Macl. A fairly large species from N. Queensland (Long., 5½ l.). Probably a member of my Group II. but as the description gives no information concerning the puncturation of the pronotum nothing confident can be said about it. If it belongs to that group it is probably distinct from any other known species, as the front of its clypeus happens to be described and is different from that of any other species (of the group) whose author has described that part.

O. lobicollis, Macl. A species of moderate size (Long., 4 l.) from Cape York. The description of the sculpture of the pronotum is to me unintelligible. However, I know no species that combines the following characters of *O lobicollis*,—very nitid, black, head and thorax greenish, thorax smooth (i.e., I suppose, unpunctured) with a large and prominent tubercle in front, head of male with a lamina which (as I read the description) is both elevated and emarginate in the middle.

O. Froggatti, Macl. I cannot find any definite character in the description of this species to distinguish it from *O. lobicollis*, Macl, unless it be that the front of the pronotum is bituberculate, but the description of the pronotum of the latter is so indefinite that I am not sure Sir W. Macleay does not mean to say that the front of its median tubercle is emarginate,—in which case the difference would be slight.

O. furcaticeps, Mast. (*furcatus*, Macl.). From N. Queensland (Long., 3½ l.). A black, nitid, species, with the pronotum unpunctured, and retuse in front with two small tubercles,—the head of the male with two contiguous horns. I have not seen any insect that can be either sex of this species.

O. acuticeps, Macl. A small species from the far North of W. Australia; black; very nitid; front of clypeus in male pointed, female rounded; two short frontal horns (apparently in both

sexes) pronotum retuse in front, with four tuberosities which are in female "not noticeable" (i.e., I suppose, very feeble); interstices of elytra convex (no information as to their puncturation). No species before me seems to fit this description.

O. fissiceps, Macl. This species from the far North of W. Australia must be extraordinarily like the insect that I regard as *O. Erichsoni*, Hope (from Port Essington) in many respects, but as its author states that the front of its clypeus is emarginate (as well as pointed and reflexed) in the male, and that some part of the pronotum is rugulose, it is no doubt distinct. I have not seen it.

O. integriceps, Macl. The description of this species is a mere enumeration of differences from *O. fissiceps*, so that it is difficult to gain a clear notion of its characters, but the best idea I can form of it seems to point to its being identical with the species referred to above as *O. Erichsoni*, Hope. The size Hope gives is Long., 4¼ l. Macleay says 6 l. My specimens vary from 4 l. to 5½ l. It should be noted however that the puncturation of the pronotum is not mentioned by Macleay as a point of difference from *fissiceps*, and if it is *not* different,—then *integriceps* is probably a good species.

O. salebrosus, Macl. This species (Long., 3¼ l.) from the far North of W. Australia is black and nitid, with a non-carinate head, the clypeus rounded in front, the pronotum rugulose, retuse in front with four tubercles, the elytra tuberculate. It is no doubt a very remarkable species, which I have not seen.

O. Orotchi, Har. This is a large species (Long., 6½l.), its exact habitat not recorded, its general colour dark brown with some parts greenish, a single elongate horn on the head of the male (the only sex described), its pronotum punctulate and in front retuse and feebly quadrituberculate. I have not seen any *Onthophagus* resembling it, and cannot determine its place in the genus.

O. lucidicollis, Bohem. A fairly large species (Long., 4¼l.), reported from Sydney. I judge from the description that it must be near *O. australis*, from which its "scarcely punctulate" pronotum and dark antennal club seem to distinguish it. Its male frontal characters are those of a very feebly developed male *australis*. It seems also to resemble *O tweedensis*, Blackb., differing by *inter alia* its dark antennal club and the obtuse front angles of its prothorax.

O. purpureicollis, Macl. This small species from N. Queeensland is very briefly described. It is said to be black, nitid, with the pronotum purplish, the head with two small tubercles, the clypeus acuminate and reflexed, the pronotum finely punctulate and retuse in front, the elytra strongly striate (no information

about the interstices, or the clypeal suture). No specimen before me seems to fit the description.

O. emarginatus, Macl. A small species from Cape York (Long., 2½ l.), black (the head and prothorax nitid and bronzy, the elytra subopaque and indistinctly marked with reddish), the clypeus feebly emarginate, the head with a frontal lamina horned at the ends, the pronotum finely punctulate and slightly retuse in front, the elytral interstices flat.

O. parallelicornis, Macl. A fairly large species (Long., 4 l.) from Cape York, black, subnitid clypeus non-emarginate, head with frontal lamina horned at each end, pronotum finely punctulate, non-retuse in front and devoid of tubercles, the elytral interstices wide and rugulose.

O. incornutus, Macl., is from Queensland (Long., 2⅓ l.), black, subnitid (pronotum of female said to be coppery, elytra spotted with red), front of clypeus almost truncate, general surface very finely punctulate, a feeble obtuse frontal carina in male (wanting in female), elytra with wide flat interstices (no mention of pronotum being retuse or tuberculate).

O. evanidus, Har. Probably near *O. Fletcheri*, Blackburn, but not likely to be identical as it is not all probable that Harold would have failed to mention the presence of elytral setæ; moreover the frontal characters of the male do not agree in the two species, *Fletcheri* has no coppery tone of colour, and the habitat of *evanidus* (Tasmania) is very remote from that of *Fletcheri*.

O. planicollis, Har. A species of moderate size (Long., 4 l.) from Cape York, black except the head and pronotum which are coppery, the head devoid of transverse carinæ, the pronotum coarsely punctulate and neither retuse nor tuberculate, the elytra with alternate interstices elevated and granulate-punctulate. Associated by its author with *O. Kingi* (? Har.), and *Erichsoni* (? Hope). By the latter name no doubt *inermis*, Macl, was intended, but *Erichsoni* is a very different insect (see my note on *O. Erichsoni*, Hope). The alternate convexity of the elytral interstices is an unusual character among the Australian *Onthophagi*. The antennæ are yellow.

O. granum, Lansb. An extremely small species (Long., 1⅛ l.) from Cape York, black, nitid (except the head and pronotum which are bronzy), the clypeus emarginate in front, the head bicarinate, the pronotum strongly punctulate and neither retuse nor tuberculate, the elytral interstices convex and unpunctured, the club dark. Said to be near *O. parvus*, Blanch., and *O. incornutus*, Macl., but the author does not say that he has seen the type of either of those species neither does it appear *probable* that he has done so, and therefore the statement probably means no more than that Lansberge has arrived at that

conclusion from his reading the very insufficient descriptions of those two. For my own part I cannot think that *granum* is very near *parvus* otherwise than superficially, if my identification of the latter (my reasons for which will be found under the heading of *parvus)* be correct. It is not of much use to compare an *Onthophagus* with an almost undescribed insect without stating the grounds on which it has been identified, so that the correctness or otherwise of the determination can be estimated.

O. promptus, Har. A brightly metallic species from "Northern Australia," of moderate size (Long., 3—3¾ l.), clypeus non-emarginate in front, head bicarinate, antennæ red, pronotum neither retuse nor tuberculate, the elytral interstices subconvex, feebly but closely punctulate. I do not think I have seen it, nor can I place it in any group as the description makes no reference to the base of the pronotum. It seems to me very probably identical with *O. viridiobscurus*, Blanch.

O. discolor, Hope. There can hardly be a doubt I think that this is a synonym of *O. viridiobscurus*, Blanch. The description is shorter than that of *viridiobscurus* but does not indicate any definite distinctive character. The size quoted is the same. The habitat of *viridiobscurus* (Raffles Bay) is very near to that of *discolor* (Port Essington).

O. viridiobscurus, Blanch. This is a species of moderate size (Long., 3½ l.) from the Port Essington region, nitid, dark metallic green, the clypeus non-emarginate in front, head without a frontal elevation *(discolor* is said to have a frontal carina, probably sexual), pronotum very finely punctulate and without carina or tubercle, elytra with striæ strongly punctulate and interstices evidently convex and very finely punctulate, antennæ brown (in the description of *discolor* called yellowish). I do not know any species near enough to *O. viridiobscurus* to need any statement of differentiating characters,—except of course the preceding two, which are probably not distinct from it.

O. rubescens, Macl. A very small species (Long., 1¼ l.) from the far North of W. Australia. Apparently very near to *O. cruciger*, Macl. (from the same region) but somewhat differently marked with blackish and having elytral interstices (not "smooth", but) minutely punctulate.

O. minusculus, Macl. From same region and of same size as the preceding. Also very near *cruciger*, Macl., but pronotum without lateral red blotch and the elytra more deeply punctulate-striate with interstices slightly convex and minutely punctulate.

O. Fabricii, Waterh. A very small species from Queensland, closely allied to *O. quadripustulatus*, Fab., its pronotum more sparsely punctulate and the head between the carinæ distinctly punctulate.

O. decurio, Lansb. A comparison of the descriptions of this and of *rubrimaculatus*, Macl., leaves little doubt that Lansberge's name is a mere synonym of the latter.

O. patruelis, Har. The description of this species clearly indicates that the name is a synonym of *O. asper*, Macl.

O. propinquus, Macl. This species does not seem to be distinguished from *O. bicornis*, Macl., by any characters that indicate more than feebleness of development. I regard the name as a synonym.

O. humeralis, Macl. Must be very near to *O. bipustulatus*, Fab, judged by the description. The type is said to be a male, and of *bipustulatus* I know only the female so I am unable to decide whether the two are distinct.

O. Duboulayi, Waterh. I can find no definite character in the description of this species to separate it from *O. jubatus*, Har., of which the name seems to me a synonym.

O. hostilis, Har. I have already (Pr. L.S., N.S.W., 1892, p. 283) pointed out that this is a synonym of *O. Adelaidæ*, Hope.

BUPRESTIDÆ.

STIGMODERA.

S. tyrrhena, sp. nov. Minus lata sat convexa; sat nitida; splendide viridis, elytris rufobrunneis, notulis viridibus (sc. margine basali; macula subhumerali ovali; fascia postmediana omnino transversa—in sutura et utrinque dilatata, exemplorum nonnullorum utrinque interrupta; macula communi apicali elongata nonnihil subquadrata; sutura a basi fere ad medium, postice dilatata; nonnullorum exemplorum sutura inter fasciam postmedianam et maculam apicalem) exceptis, lateribus læte rufis; corpore subtus sparsim breviter albido-pubescenti; capite elongato inter oculos (his leviter obliquis) concavo, crebre sat fortiter punctulato; prothorace quam longiori et postice quam antice ut 8 ad 5 latiori, supra sat fortiter (apicem versus magis subtiliter et magis crebre, latera versus magis crebre) punctulato, lateribus a margine antico longe pone medium divergentibus hinc ad basin fere parallelis, intra angulos posticos vix manifeste foveolato; elytris ad basin leviter antrorsum convexis, pone medium modice dilatatis ad apicem sat fortiter bi-apiculatis, sat fortiter punctulato-striatis, striis 7ª 8ª que antice ad humeros abbreviatis, interstitiis subfortiter punctulatis antice minus convexis apicem versus subcostiformibus, lateribus haud crenulatis; unguiculis inermibus. Long., $5\frac{1}{2}$ l.; lat., $2\frac{1}{5}$ l.

Much like *S. delectabilis*, Saund., in respect of sculpture and coloring (except in the dark parts being of a brilliant green), but

of narrower and less flattened build and with the head considerably more elongate, the base of the elytra margined with green, and the basal two ventral segments much less closely punctulate at the sides.

Queensland (Mr. Lea).

S. subpura, sp. nov. Sat lata, minus convexa; sat nitida; violacea, capite prothorace scutelloque æneis, elytris brunneo-testaceis (basin suturaque anguste,—hac antice paullo magis late,—infuscatis), macula parva nigra transversim ovali communi anteapicali notatis, antennis basin versus cyaneis apicem versus aureis; capite modice producto, sat fortiter sat crebre punctulato, inter oculos (his leviter obliquis) late profunde concavo; prothorace quam longiori (et postice quam antice) ut 12 ad 8½ latiori, subgibbo, haud manifeste canaliculato, supra sat fortiter sat sparsim (antice magis crebre, latera versus crebre sat rugulose) punctulato, lateribus minus arcuatis, latitudine majori paullo pone medium sita; elytris ad basin antrorsum bisinuatim sat fortiter convexis pone medium sat fortiter dilatatis, ad apicem breviter biapiculatis processubus inter se sat approximatis sat æqualibus), striatis, striis subfortiter punctulatis, interstitiis 1°—3° subtiliter sparsim (ceteris confertim minus subtiliter) punctulatis, interstitiis 1° 3° 5° 7° 8° que (7° 8° que antice conjunctis) antice latis tumidis (ut *S. amplipennis*, Saund.), aliunde interstitiis antice minus postice magis convexis, angulis humeralibus rectis. Long., 5 l.; lat., 2 l.

Should be placed near *S. amplipennis*, Saund., from which it differs *inter alia multa* by the remarkable difference between the puncturation of the nearest three interstices to the suture and that of the other elytral interstices.

N.S. Wales (in my collection; also taken by Mr. Lea).

CLERIDÆ.

MACROTELUS.

Trans. Roy. Soc., S.A., 1901, p. 25. I described a species under the name *Elasmocerus picticollis*. Herr. Schenkling (Deutsche Ent. Zeitsch., 1903, p. 12) has displaced the name *Elasmocerus* in favour of *Macrotelus*. There seems to be no doubt of the two names being synonyms but Lacordaire rejected the latter as a *nom. præocc.* on account of *Macrotelia* having been previously used. I presume that Schenkling regards *Macrotelia* as a name that does not invalidate *Macrotelus*, in which I agree with him. I regret that I accepted Lacordaire's conclusion without weighing his premises and therefore call attention to the fact that the insect referred to above should be known as *Macrotelus picticollis*, Blackb.

NATALIS.

N. Leai, Blackb. In describing this species (Tr. R.S., S.A., 1899, p. 31) I referred to its agreement in non-generic characters with the description of *Opilo floccosus*, Schenk. (published in 1898) but pointed out that as Schenkling especially mentioned his insect having the securiform maxillary palpi and bifid tarsal lamellæ of an *Opilo* the two species must be distinct. I find, now, that Schenkling has published a note (Deutsche Ent. Zeitsch., 1903, p. 19) to the effect that he has examined more specimens of *O. floccosus* and observes the characters referred to above to be in reality as in *Natalis* to which genus his species must therefore be transferred. This of course makes it identical with my *N. Leai*; and the synonymy will be as follows

Natalis (Opilo) floccosus, Schenk.
Leai (Natalis), Blackb.

TENEBRIONIDÆ.

EXANGELTUS.

E. gracilior, sp. nov. Opacus; nigro-piceus, antennis palpis pedibus et corpore subtus plus minusve rufescentibus; anguste elongatus; sat convexus; setis brevibus subtilibus minus crebre vestitus; prothorace minus fortiter transverso, antice parum emarginato (quam postice sat angustiori), longitudinaliter confertim subtilius strigato, lateribus antice leviter arcuatis postice fere rectis, angulis anticis bene determinatis leviter obtusis posticis subacutis retrorsum directis; elytris sat parallelis, quam prothorax sat latioribus, striis circiter 17 crebre punctulatis impressis, harum puncturis quadratis, interstitiis angustis (alternis vix prominentibus); corpore subtus crebre sat fortiter punctulato; antennis sat elongatis; oculis magnis. Long., 4 l.; lat., $1\frac{2}{3}$ l.

Considerably smaller than *E. angustus*, Blackb. It has longer and more slender antennæ, the 3rd joint of which is as long as the 4th and 5th together, while the 10th and 11th together are scarcely longer than the 9th; the head is less depressed than in *E. angustus* but (as in that species) the clypeus is not separated from the front by any transverse furrow or noticeable suture; the prothorax is considerably less transverse than that of *E. angustus* and the longitudinal wrinkling of its surface is very much finer; on the elytra the intervals between puncture and puncture in the striæ are of the same height as the interstices between the striæ (except the alternate interstices which are very slightly prominent); the setæ of the dorsal surface are much finer and less conspicuous. The tarsi are (like those of *E. angustus*) clothed beneath with soft close pubescence.

S. Australia; near Woodville.

CHRYSOMELIDÆ.

PHYLLOCHARIS.

P. melanocephala, Baly. In the Proceedings of the Australasian Association for the Advancement of Science, 1902, p. 402, Mr. Lea announces the occurrence in N.S. Wales of a species under the above designation. I cannot find that Baly described such an insect. Perhaps Mr. Lea refers to *P. melanospila*, Baly, described in the Journal of Entomology, Vol. I., p. 290.

AUGOMELA.

A. ignita. In the Proceedings of the Australasian Association for the Advancement of Science, 1902, p. 417, Mr. Lea has described an insect under this name, having apparently overlooked the fact that Mr. M. Jacoby had already described an Australian *Augomela* under the same name. It appears to me that the two descriptions are founded on the same species, although Mr. Lea's brevity (omitting *e.g.* a description of the shape of the prothorax) makes it difficult to be confident. Jacoby's type (Ann. Ent. Soc. Belg., 1898, p. 368) was from Richmond, N.S.W.,—Lea's from Illawarra, N.S.W.

POSTSCRIPT.

While the preceding pages have been in the printers' hands it has occurred to me that above, in my tentative Revision of the genus *Onthophagus*, I have used the term "metasternum" somewhat loosely. "Disc of the metasternum" would have been more accurate, as in every case where the segment is mentioned it is the horizontal surface (bounded laterally by the lines of the intermediate coxæ produced hindward to the abdomen) that is referred to, and the "sides of the metasternum" mean the lateral parts of that horizontal surface.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia

(INCORPORATED)

FOR 1902-3.

ORDINARY MEETING, NOVEMBER 4, 1902.

Professor E. H. RENNIE, D.Sc. (President), in the chair.

EXHIBITS.—WALTER HOWCHIN, F.G.S., on behalf of A. Fergusson, exhibited a piece of quartzite from Curramulka, Y.P., rounded and striated on one side by ice action. A. H. C. ZIETZ, F.L.S., showed some 23 species of fish from the Lower Murray. G. G. MAYO a few specimens of mudstones containing pebbles, from the Razorback near Hallett, which Mr. HOWCHIN pronounced to be of glacial origin and of the same age as the Cambrian glacial beds of the Sturt and Onkaparinga Rivers. H. T. PHILLIPPS and T. C. GREENWAY B.Sc., showed in large numbers and variety rock specimens and rock sections from Southern Yorke Peninsula to illustrate their paper.

BALLOT.—W. H. Baker, chemist, Glen Osmond Road, Parkside, and W. J. Vandenbergh, barrister and solicitor, Adelaide, were elected as Fellows.

PAPER.—"Notes on the Geology of Southern Yorke Peninsula," by T. C. Greenway, B.Sc., and H. T. Phillipps, communicated by W. HOWCHIN, F.G.S.

A vote of thanks was passed to those exhibiting specimens and those giving the paper.

ORDINARY MEETING, APRIL 7, 1903.

Professor E. H. RENNIE, D.Sc. (President), in the chair.

EXHIBITS.—A. H. C. ZIETZ, F.L.S. (Assistant-Director of the Museum), native instruments, &c., from Way College, including stone for crushing and bruising seeds, stone axe from Rivoli Bay, necklace of *Dentalium* shells from Western Australia, several pointing-sticks of hardwood stained with blood and ornamented with eagle feathers and human hair; bone breccia from Naracoorte Caves. Mr. ZIETZ also exhibited a pair of musical instruments from Central Australia, of mulga wood. Referring to the bone breccia, Mr. HOWCHIN said that the deposit is covered by about

a foot depth of stalagmitic material. J. G. O. TEPPER, F.L.S., showed two cases of Australian *Phasmidæ*, illustrating his paper read before the Society in October last. He remarked these were some of the largest insects evolved and exclusively vegetable feeders. Mr. TEPPER also laid on the table a fossil leaf from the Ardrossan Tertiaries. STIRLING SMEATON, B.A., mentioned that he had found a Phasmid, or stick insect, very closely resembling the leaf of a *Casuarina*, the tree on which the insect was captured. W. H. BAKER exhibited a crab *(Portunus corrugatus)*, Pennant, described as far back as 1777, and interesting as having a wide distribution. The present specimen was dredged by Dr. Verco in Investigators Straits last January. W. H. SELWAY showed specimens of friable kaolinised felspathic rocks from Longwood Gully, which is being used for the manufacture of porcelain. W. HOWCHIN, F.G.S., placed on exhibit before the meeting a number of gypsum crystals discovered by Mr. James A. McGavisk in the sides of a creek between Glenelg and Fulham. The gypsum has formed in nests of crystals in the subfossil bed characteristic of the raised sea area between Plympton sandhills and the coast. Within geologically recent times these marshy flats were open to the sea, but in its retreat the marine forms became extinct over the area, and the land has gradually sweetened. The gypsum is most probably the result of the evaporation of sea water. Whilst the sodium chloride has been carried off by drainage, the less soluble calcium sulphate (gypsum) has crystallised out in the saturated estuarine silts, and in so doing has included numerous shells in the crystals thus formed. These crystals have a brown colour from the earthy matter included within them, and many of those which formed in the shelly stratum, where there would be a freer circulation of water, have suffered corrosion. Mr. HOWCHIN also exhibited a number of rock specimens and native implements to illustrate his paper.

PAPERS.—"Further Notes on the Geology of Kangaroo Island," by W. HOWCHIN, F.G.S.; "Further Notes on the Australian *Coleoptera*," by Rev. THOS. BLACKBURN, B.A.

ORDINARY MEETING, MAY 5, 1903.

Professor E. H. RENNIE, M.A., D.Sc. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed a species of scale insect *(Mytilaspis pomorum)* that does much mischief to the apple and is in some respects worse than the codlin moth. Mr. TEPPER also exhibited specimens of tourmaline and cairngorm from the vicinity of Antechamber Bay, Kangaroo Island. W. HOWCHIN, F.G.S., mentioned that a company had been formed to work this deposit, and explained the conditions under which these gems were found and their probable origin. W. G. WOOLNOUGH, B.Sc.,

F.G.S., exhibited specimens of tourmaline and beryl from near Williamstown.

By-laws.—The by-laws drawn up by the Council were agreed to, subject to certain verbal alterations suggested by the meeting.

Ordinary Meeting, June 2, 1903.

Walter Rutt, C.E. (Honorary Treasurer), in the chair.

Apology from President for non attendance.

Exhibits.—A. H. C. Zietz, F.L.S. (Assistant-Director of the Museum), exhibited a bunch of *Eucalyptus* seed cases, and a head and some bones of the English garpike *(Belone vulgaris)*. A peculiarity of the bones of this fish is that they are green. Mr. Zietz also exhibited some very large barnacles *(Balanus* sp.) from Thistle Island; a thread worm *(Gordius* sp.) from a cockroach; the skull of a rabbit, with the incisors in both jaws grown to abnormal length and curved; and a specimen of fluorite in a piece of crystalline limestone from Brighton. In reference to the green bones of the garpike, Mr. Woolnough remarked that the colour may be caused by the presence of vivianite in the bones, phosphate of iron having to some extent displaced the phosphate of lime. This may take place either under healthy conditions or the reverse. Mr. Zietz also laid on the table a specimen of molybdenite from N.S. Wales. Mr. Tepper stated that he had found deposits of the same mineral near Reynella and Yorke Peninsula, and Mr. Stirling Smeaton had found it in the gorge of Reedy Creek, near Mannum. Mr. Woolnough stated that molybdenite was found in large blocks at Glen Innes, in N.S. Wales, and at Moonta, in this State; that it was not of much value commercially, but was used in the manufacture of steel. J. G. O. Tepper, F.L.S., exhibited a case of Northern Territory butterflies, presented to the Museum by Mr. E. H. Hallack, and pointed out how some of the specimens were devoid of scales on the anterior wings, except where the dark markings occur, and that in some instances the males, though smaller, were more beautiful than the females. Mr. Tepper also showed a stone axe of European origin from the collection of the late Mr. Henry Marshall, and a flake with serrated edges—evidently used as a saw—from the same collection. Referring to these, Mr. Woolnough said that the stone from which the axe was shaped might be diorite or aphanite, whilst the flake might be of porcelanite or chert. Mr. Tepper showed nests of the *Thyridopteri.e huebneri* from Mount Lofty, which presented the appearance of ragged bags, also a rare fungus on daisy leaves *Puccinea distincta*, McAlpine.

W. G. Woolnough, B.Sc., F.G.S., then gave a most interesting and instructive account of the "Metamorphism of Rocks."

Ordinary Meeting, July 7, 1903.

Prof. E. H. Rennie, D.Sc. (President), in the chair.

Exhibits.—J. G. O. Tepper, F.L.S., passed round a small phial of dark liquid which exuded from certain rocks at Montacute. When first taken it was clear and yellow in colour, and burns with a smoky flame. Other exhibits by Mr. Tepper were a bag of *Thyridopterix huebneri* from Mount Barker, a stick case of the moth *Entomita ignobilis*—a rare neuropterous insect from Umberatana, in the moth stage; the anterior wings are narrow, whilst the posterior ones are filiform and longer than the body—and also a cotton boll-worm (*Heliothis armiger*). The moth of this insect flies by day, whilst the caterpillar feeds at night, and in the day buries itself in the ground. In America it does much mischief in cotton and corn crops. Mr. Samuel Dixon showed a specimen consisting of fine acicular crystals of sulphate of zinc, gathered from rock surfaces in a mine in North Queensland, where they were found some six inches in length. W. Howchin, F.G.S., referring to a paper read by him in April last on the "Geology of Kangaroo Island," exhibited some specimens of bitumen and resin found on the coast by him during his late visit to the Island. The bitumen was slightly the heavier, and each of less specific gravity than seawater. In discussing the probable source of these waifs, Mr. Howchin suggested that the antarctic current which impinged on the Southern Coast of Australia—passing, as it does in its course, Kerguelen and other oceanic islands—may be the agent of their distribution. Seams of coal, as well as Tertiary deposits, exist on Kerguelen Island, so that these pieces of bitumen and resinous fragments so widely distributed along the southern shores of Australia may possibly come from thence. Mr. Howchin also exhibited gems obtained from Kangaroo Island during his late visit, which residents had supposed to be rutile, but were precious tourmaline of both green and pink varieties, and strongly dichroic. The gems were of good commercial value. The same gentleman showed a pebble from Marino Beach carrying organic remains, which Mr. Etheridge, of the Australian Museum, Sydney, believes to be a coral of ancient type—*Archæocyathinæ*—not found above the lower Cambrian system. The origin of the pebble is doubtful. Prof. E. H. Rennie, D.Sc., in introducing the subject of Coorongite, said he wished to bring under the notice of the meeting a paper recently read before the Royal Society of Victoria by Mr. A. Cumming, who had investigated the nature of Coorongite by chemical analysis. Jackson had also made some observations on this substance, which had been published in the Pharmaceutical Journal for 1872. Mr. Cumming first treated the Coorongite with bisulphide of carbon. Neglecting the ash, he found about

one-third dissolved out, and after evaporation of the carbon bisulphide a soft yellow substance remained. The part that remained undissolved in the carbon bisulphide consisted of a brittle dark coloured mass. Neither of these substances were hydrocarbons; both contained oxygen, and were represented by the formulæ—the first $C_{10}H_{18}O$, the latter $C_{10}H_{20}O$; and the former by oxidation readily passed into a substance similar to the latter. These formulæ suggest a connection with vegetable substances of the turpentine and caoutchouc series, and so far as this goes tend to indicate a vegetable rather than a mineral origin. In other words, they do not suggest any connection with petroleum.

PAPER.—"An Analysis of the Ash of the *Acacia salicina*," by A. J. HIGGIN.

ORDINARY MEETING, AUGUST 4, 1903.

Prof. E. H. RENNIE, D.Sc. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., a sprig of sugar gum (*Eucalyptus corynocalyx*), rendered sickly by a scale insect, probably *Eriococcus paradoxus*, causing a branchlet of juvenile leaves to grow. A black substance on the leaves, it was pointed out, was a fungus growth on the sugary secretion of the coccus. A case of handsome butterflies and beetles from Queensland, presented to the Museum by Mr. Sam. Dixon, was also shown. W. HOWCHIN, F.G.S., referring to that part of his paper read before this Society in April last, on the evidence of occupation of Kangaroo Island by an aboriginal population, exhibited three "native hammers," stones showing signs of use, which had been collected by Mr. S. Buck near the N.E. extremity of the Island. The same gentleman also forwarded two round, smooth stones, known as "seal bullets," or stomach stones of the seal. A. H. C. ZIETZ, F.L.S., some cocoon-like limestones of concretionary origin from Streaky Bay. These stones were open at one end, smooth inside, and slightly rough outside, but whether they are the work of animals or not is not known.

PAPER.—"Note on Supposed Volcanic Dust from Northern Territory," by Prof. E. H. RENNIE, D.Sc., A. J. HIGGIN, and W. G. WOOLNOUGH, B.Sc., F.G.S.

J. S. LLOYD made some interesting remarks on the proposed Trans-Canadian Railway, which it is proposed to construct across the Dominion.

ORDINARY MEETING, SEPTEMBER 8, 1903.

Prof. E. H. RENNIE, D.Sc. (President), in the chair.

A letter bearing date 20th June, 1903, was read from Messrs. Henderson & Hayward, solicitors, reporting that the Incorporation of the Royal Society of South Australia had been effected,

and that the Certificate of Incorporation had been deposited in the General Registry Office, as required by the Associations Incorporation Act, 1890. It was further stated that the Rules on parchment had been filed, and also a memorial of George Gibbes Mayo's appointment to the office of sealholder, in his capacity as Secretary. The Society has therefore now the right to use the word "Incorporated" as part of its title.

W. HOWCHIN, F.G.S., referring to bituminous substances being found from time to time on the southern shores of Australia, and to the suggestion put forward by him as to its probable source being Kerguelen Island, read a cutting from a newspaper which seemed to give some support to this idea. It stated that a bottle thrown into the sea by Capt. Ord in lat. 46° S., long. 92° 20′ E., which is between Kerguelen Island and the mainland, had been picked up on the coast of New Zealand, showing an easternly drift.

PAPERS.—"Notes on *Loranthus exocarpi*," by CHAS. F. JOHNCOCK; "Description of New Species of Tertiary Corals," Part VI., by JOHN DENNANT, F.G.S.; "Description of New Australian *Xysmatodoma*," by OSWALD LOWER, F.E.S., Lond.; "Notes on the Petrography of the Olary District," by W. G. WOOLNOUGH, B.Sc., F.G.S.

ANNUAL MEETING, OCTOBER 27, 1903.

Prof. E. H. RENNIE, D.Sc. (President), in the chair.

EXHIBITS.—W. J. VANDENBERGH exhibited some interesting photographs taken during his recent visit to the Northern Territory; also several specimens of cotton and kapoc, and various kinds of arrowroots, as products of the district. J. G. O. TEPPER, F.L.S., showed a peculiar cricket (*Cylindrodes Campbelli*) and a case of Australian crickets. EDWIN ASHBY placed on exhibit a skin of the Rifle bird (*Ptilorhis paradisea*) from Queensland.

The annual report and balance-sheet were read and adopted.

ELECTION OF OFFICERS.—President, Joseph C. Verco, M.D., F.R.C.S.; Vice-Presidents, Prof. E. H. Rennie, M.A., D.Sc., Rev. Thos. Blackburn, B.A.; Honorary Treasurer, Walter Rutt, C.E. Two members of Council to fill the places of those retiring —Walter Howchin, F.G.S., and Edwin Ashby.

The newly-elected President having taken the chair, Prof. RENNIE, the retiring President, gave his address on "The Fisheries of Australia."

Mr. HOWCHIN moved that the thanks of the meeting be given to Prof. Rennie for his exceedingly interesting and opportune address, and that it be printed in the Transactions of the Society. This motion having been seconded by the Rev. T. BLACKBURN, B.A., was passed.

ANNUAL REPORT.

The Council calls the attention of members to the incorporation of the Society which has been effected in its jubilee year, and desires to review briefly the past history of the Society.

In the year 1853 a few gentlemen met in Adelaide for the purpose of forming themselves into "The Adelaide Philosophical Society." The most prominent of these was the late Mr. John Howard Clark, who was subsequently so well known as one of the proprietors and editors of the "South Australian Register."

During the next twenty years or so each Governor of the province became, in turn, President of the Society, whilst many of the leading citizens of Adelaide were enrolled in its membership, including many well remembered professional men.

In the first year of its existence the Society adopted a code of laws, the first of which set out its aims as follows:—"The Society shall be called the Adelaide Philosophical Society, and shall have for its object the discussion of all subjects connected with science, literature, and art." This programme was fairly adhered to, but it is noticeable that the general tendency of the papers was distinctly scientific, or of a practical and industrial nature. In 1876 the late Professor Ralph Tate, F.G.S., who had recently arrived in Adelaide to take the Chair of Natural Science in the infant University, joined the Society, and the next year was elected President. This office he retained for two sessions, and in subsequent years frequently occupied the same honorable position.

From this time, too, the Governor of the State accepted the office of Patron. With the advent of Professor Tate the whole work and objects of the Society were extended. The rules drawn up in 1878 show this, No. 2 reading thus:—"The objects of the Society are the diffusion and advancement of the arts and sciences by the meeting together of members for the reading and discussion of papers connected with the above subjects and by other approved means." In 1879 permission was obtained for the Society to assume the title of "Royal," and henceforth to be known as "The Royal Society of South Australia." New rules were adopted, and the work of the Society and the aims of its mem-

bers were more and more animated and inspired by the genius and work of Professor Tate, who for twenty years, until his death, largely contributed by his paleontological work and scientific papers to place this Society in the honorable position it now occupies in the scientific world.

The papers submitted to the Society during the year give evidence of much valuable work having been done in original observations. The Rev. Thos. Blackburn, B.A., whose zealous labors in determination of Australian coleoptera have enriched the Transactions of the Society for a number of years, has been again an important contributor. In the same department of research, Mr. Arthur M. Lea has submitted Part II. of his "Descriptions of Australian Curculionidæ." Dr. A. Jefferis Turner and Mr. Oswald B. Lower have, respectively, still further extended their observations on the Australian *Lepidoptera*, which are embodied in lengthy papers. Mr. John Dennant, F.G.S., has contributed another valuable paper in elucidation of the "Tertiary Corals of Australia." Mr. W. Howchin, F.G.S., in "Further Notes on the Geology of Kangaroo Island," has dealt with the evidences of extinct glacial action on the eastern side of Kangaroo Island, and other geological and ethnological facts connected with the island. Mr. W. G. Woolnough, B.Sc., F.G.S., has, during the session, submitted some interesting "Notes on the Petrology of the Olary District," whilst other papers connected with physical science and industrial subjects have been contributed by Professor E. H. Rennie, D.Sc. and Mr. Higgin, and Mr. Chas. F. Johncock has given some additional observations on the distribution of *Loranthus exocarpi*. The Council has accepted several other papers which will be placed before the Society in due course.

The microscopical section has been revived with Mr. D. Fleming as chairman, and some 30 members.

The Council would remind the members that the Research and Endowment Fund which it is hoped will follow upon the recent incorporation of the Society, will open out wider fields of usefulness for the Society than have hitherto been possible. This desirable movement is largely due to the initiative and energy of Mr. Samuel Dixon.

During the year now closing only two Fellows have been added to our number. The membership comprises 11 Honorary Fellows, 69 Fellows, 7 corresponding members, and two associates.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA (INCORPORATED).

Dr.	£	s.	d.	£	s.	d.
October 1st, 1902.						
To Balance				231	7	1
" Subscriptions—						
Royal Society	69	0	6			
Field Naturalists' Section	14	10	0			
				83	10	6
" Government Grant				52	12	3
" Interest				5	8	9
				£372	18	7

Cr.	£	s.	d.	£	s.	d
By Transactions—						
Printing	166	17	1			
Illustrating	19	7	6			
Publishing	10	12	5			
				196	17	0
" Memoirs—						
Printing	44	5	0			
Publishing	8	15	4			
				53	0	4
" Grant-in-aid—Field Naturalists' Section				10	0	0
" Library—						
Salary of Librarian	7	10	0			
Sundries	2	13	0			
				10	3	0
" Incorporation and New Rules ...				18	6	11
" Wages—Caretaker				3	0	0
" Printing, Postage, Stationery, &c. ...				13	1	2
" Advertising				3	5	11
" Exchange on Cheques				0	0	6
" Balance in Savings Bank, October 1, 1903				65	3	9
				£372	18	7

Audited and found correct.

J. S. LLOYD, F.I.A.S.A.

Adelaide, 1st October, 1903.

WALTER RUTT, Treasurer.

PRESIDENT'S ADDRESS.

By Professor E. H. Rennie, M.A., D.Sc.

Subject—"The Fisheries of Australia."

In an address which I delivered before this Society two years ago I referred briefly to Australian fisheries, their preservation, and replenishment. Since then considerable attention has been drawn to the question in the S.A. "Register," and some interest has been aroused; but the great importance of the subject is yet but imperfectly realised, or, at least, there is still a great deal of apathy on the part of the public. It is in the hope of enlisting your interest and sympathy, and possibly of inducing the Society as a whole to take an active part in supporting measures now before Parliament, that I venture to deal at some length with the fisheries question. I cannot claim originality in regard to the matter included in this address, nor can I pose as an expert. I am well aware, too, that the arguments and suggestions which I am about to lay before you have, for the most part, been already urged in the press, and in a report by Mr. T. Duffield, Chief Inspector of Fisheries in this State; but, nevertheless, the importance of the question is, in my opinion, so great that I ask for your sympathy while I once more bring it under your notice.

It is a matter of common remark among amateur fishermen that it is much more difficult to secure good fishing than it was 20 years ago. In some places, such as Sydney Harbor, for example, where, say 30 years ago, good fishing was easily obtained, it is easy enough to account for the change, the pollution of the water by the refuse, and till quite lately by a considerable portion of the sewage of the city, being of itself quite sufficient cause, to say nothing of the constant disturbance due to the large amount of steam traffic on the water. But such local causes can hardly account for the fact that in the ocean outside, schnapper, for instance, are becoming much scarcer, and fishing parties are obliged to go much longer distances north or south to secure any number of fish. The same thing is happening, so far as I can gather, all along the inhabited portions of the Australian coast. It is a matter of common knowledge that, whereas schnapper could easily be obtained in numbers close to Port Victor, and even so close at hand as in the Port River, they are now comparatively

scarce. Even on the fishing grounds between Port Victor and Kangaroo Island, and in the vicinity of the latter, fish in any quantity are obtained with increasing difficulty. These statements apply not only to schnapper, but to many other kinds of fish, the sweep, for instance. Ten years ago it was easy anywhere two or three miles along the coast west from Port Victor, on a suitable day, to secure good bags of this valuable fish; *now* this happens only occasionally, and the fish are smaller. I have noticed also that other varieties of fish which haunt the rocks and which were occasionally caught by rod and line, are now rarely secured at all. Even the mullet, though they are still caught in large numbers, are gradually becoming less plentiful, and the fishermen on the south coast complain more and more of the uncertainty of securing good hauls in the season. It is not easy at first sight to account for this falling off, considering the great stretch of ocean on the east, south, and west of us, especially when it is remembered that fishing on a large scale, if it can be called a large scale, has only been going on for about 50 or 60 years, and in many places, on our south coast, for example, for much less than that. If we examine a particular case, say that of the sweep already mentioned, we find that it is a fish taken entirely by line, and, generally speaking, in very calm weather only, so that there is no rapid destruction from any ordinary cause. In the neighborhood of Port Victor there is practically no pollution of the water, no disturbance by ocean traffic, and as we have seen there can be no wholesale destruction of the fish by man. Large numbers of the young fish still haunt the coast, and they are found in almost every rock hole which is washed by the ocean. Why, then, should there be such a falling off? Does this fish take so long to reach maturity that the catching of the larger ones in a particular locality leaves a gap which years of protection will be necessary to fill up? Is their food supply running short? Are they being prevented in any way from gaining access to their proper spawning grounds? Is the balance of life being disturbed in such a way as to involve the destruction of large numbers of the young fry? Or are all these causes contributing to the result? One would naturally suppose that some disturbance of the balance of life is the most probable cause, but such disturbances, though generally easily followed on land, are by no means so easily traced among marine animals. A writer in the "Contemporary" for July, 1901, to whom I referred in my previous address, gives interesting particulars bearing on this point with reference to the fish on the English coasts. According to his statements,

certain fish, such as the hake, bass, and haddock are now very rarely seen, though they were plentiful not long ago. On the other hand, the picked dog shark and the porpoise have, unfortunately, considerably increased, and both of these are causing extensive injury to the pilchard, herring, and mackerel fisheries. The author states that the only thing which seems to disturb the dog sharks is the advent of numbers of the maternal ling fish on their way to their spawning grounds. They are able to drive away the depredators, and it is suggested that quite probably the hake, with its sharp teeth, was able, before its partial extinction, to produce the same effect as the ling fish. Porpoises were at one time extensively captured on the American coasts for their oil, which commanded a ready sale, until, on their becoming scarce, another source of an equally good oil was found, and the hunting of the porpoise ceased. It is suggested that porpoises might be again utilised on the British coasts, or a reward offered for their destruction.

It is obvious, therefore, that by continuous destruction of some kinds of fish, and neglect to provide for the continuance of the species, coupled with the failure to destroy other kinds, the balance of nature is disturbed and enormous injury caused, and there are signs that this is taking place on our own coasts as well as elsewhere. It is well known that there is now a serious falling off in the fish supply of the United Kingdom, or perhaps it would be more correct to say the fish are much more difficult to find, and that the supply is only kept up by more perfect appliances for capture and for delivery in a condition fit for consumption. Steam trawlers, for example, have been introduced, their speed has been increased, and they can, therefore, travel longer distances. They now go as far as Iceland northwards, and the Bay of Biscay southwards, and experiments have been made by Scottish trawlers as far as Newfoundland, the result in the latter case, however, being only smaller hauls than were obtainable 30 years ago on the British coasts. In fact, were it not that the authorities are waking up to the necessity for action the almost total extinction of certain kinds of fish would seem to be only a question of time, and this will, I believe, take place here unless the authorities take up the matter in thorcugh earnest. It is quite true that we know too little of the conditions prevailing here to state exactly the cause of depletion, but that is all the more reason for trying to find out the influences at work. This leads then to the consideration of the remedy, if any be possible, for the existing state of affairs. The first point to be emphasised is the

necessity for closer observation of the habits, food, and life history of the fish. As regards habits and food much valuable information can be gained from fishermen, but allowance must be made for inaccuracy. The results of their observations are not noted down at the time they are made, and too much reliance is apt to be placed on memory—in most cases an unsafe guide. Moreover, such observations must necessarily be imperfect. The desirability for close and accurate investigation cannot, in fact, be too strongly urged, and such investigation can only be carried out by trained men. Practically nothing is known, so far as I can ascertain, of the life history of our most valuable fish. An important step in the direction of obtaining such knowledge has, however, been made by the N.S.W. Government in the appointment of Mr. H. C. Dannevig as an expert inspector to superintend all fisheries investigations, and, in addition, to initiate a system of fish hatching, and to the publication by the N.S.W. Government of papers and lectures by that gentleman I am largely indebted for facts mentioned in this address. In a lecture delivered before the Amateur Fishermen's Association in Sydney on "Marine Fisheries and Fish Culture," Mr. Dannevig points out that owing to recent careful enquiry in Europe and America, much light has been thrown on the reproduction of fish, and much that was till recently obscure is now understood. The reproduction takes place in various ways. A few fish are viviparous and give birth to from a few dozen to about one hundred of their young, and these are born under such conditions as to lead to the survival of the majority. A second and more common method of reproduction is by means of what are called demersal eggs, these being of comparatively large size and hardy. They are deposited either in large bunches or clusters, usually hidden away in undisturbed places, or separately on seaweed or some other article on the sea bottom. The larvæ from these eggs are fairly well developed, but still are more liable to destruction than those which have been born alive in a more mature condition. Consequently the number produced by the female fish is from a few thousand to forty or fifty thousand. This method of reproduction is observed chiefly among fresh water fish, but it has been noticed also in the case of a few sea fish. A third and still more common method is by means of pelagic or floating eggs, which are deposited a few at a time near the coast, and which, being carried hither and thither, some to the shore and some to mid-ocean, are subject to enormous destruction. To counterbalance this the female fish produces eggs in great numbers from 250,000 to as many as twenty mil-

lions. The writer in the "Contemporary Review" to whom I have previously referred, mentions facts in reference to the turbot which it may be of interest to quote here. He says: "As spring advances turbots leave the outer depths of the English Channel and move towards the land for the purpose of spawning. This interesting work is generally accomplished within the limits of some three, four, or five miles from the shore, the female shedding from five to fifteen millions of eggs, so that it must be at once seen that as the turbot is one of the most productive of creatures, it ought to be one of the most plentiful fishes on the coasts. But note what follows. By July young turbots about half an inch in diameter may be found on the surface of the sea making their first journey towards the land. This effort takes them a month or six weeks to accomplish, their home being, for the first twelve months of life, on the sea bottom within a hundred yards of the shore. But the crossing of this narrow strip of sea brings fearful results to these little ones. The destruction of Napoleon's hosts fleeing from their enemies across the frozen Steppes of Russia will not compare with the yearly losses sustained by these innocents from the horrid beaks of the gulls. History tells us the remnant left of the former was about one in a hundred of that wretched army, whereas I question if of the latter there are left so much as one in a million of these valuable creatures. And the result of their having to run the gauntlet is that, instead of being one of the most numerous fishes on the coast, this ordeal has brought them down to be about the least of all our food fishes." The same writer goes on to point out that the Conger eel also produces from five to fifteen million eggs, but, inasmuch as the young pass through the early stages of their life on the sea bottom among rocks and seaweed, and are, therefore, not exposed to the same dangers as the turbots, they are among the most numerous fish on the British coasts.

It has been already said that very little is known of the life history of Australian fish, yet the statement will bear repetition that this is the first thing to be carefully studied if remedial measures are to be effective. In my address two years ago I spoke of statements made by fishermen at Encounter Bay to the effect that in 1901, when the barracoota were abundant on the coast, they had observed enormous numbers of minute fish near the surface of the water, and these were being devoured in myriads both by gulls and barracoota, the latter being full of them. What these small creatures were they did not know, and probably did not care. It would have been a matter of much interest and quite

possibly of great importance to have determined what they were, and that might easily have been done had there been in this State a competent inspector alert to make enquiries and capable of following up his enquiries by careful investigation. Reference has already been made to the appointment of such a man in N.S.W., and I am informed privately by Mr. Duffield that it is proposed to ask the N.S.W. Government for the loan of his services for a time in order that he may examine into the conditions along our S.A. coasts, and perhaps instruct a local officer as to the lines on which observations should be carried out in the future. Such a proposal would, I am sure, be heartily welcomed by all who are interested in the state of our fisheries, but it will need more than that to cope with the difficulties with which we are faced. I may quote here from the lecture of Mr. Dannevig before referred to. He says: "Latterly it has been recognised, however, that while most excellent and necessary work was carried out by marine laboratories, many important questions relating to marine fisheries could not always be solved ashore. It was found necessary to extend the investigation to the sea itself and where it was essential in order to arrive at a satisfactory solution of questions of a practical nature, to enquire into these in a rational manner and on a sufficiently extensive scale to eliminate the exceptions which often will attend upon experiments carried out upon a small and otherwise limited scale, and give rise to regrettable misconceptions. Such practical investigations, conducted on scientific principles, have lately been carried out by leading men. Dr. Wemyss Fulton, the superintendent in charge of the fishery investigations under the Scottish Fishery Board, has lately dealt with fishery problems in such a way and with singular success. Similar work has also been carried on by Professor Herdman and others in England, while the Americans have long recognised the necessity of carrying out practical investigations. Amongst the European countries bordering on the North Sea there has been evinced lately a strong desire to combine their efforts to enquire into the various factors bearing upon the now greatly declined fisheries of the North Sea. International conferences were held from time to time with a view to establishing co-operation, and, after protracted negotiations, an arrangement has now been made. Great Britain is taking a principal part in this work, and for the coming three years has undertaken to expend a sum of £42,000 on the portion of the work allotted to her. The undertaking is a gigantic one, and, whatever the result may be, it shows the recognition by the leading European countries of the

necessity of treating the fishery questions rationally, systematically, and thoroughly, with a view to arrive at a basis for international legislation applicable to the whole sea area from which they have in the past extracted their enormous supplies, and wherein the natural resources are slow in replenishing supplies, and where depletion prevails."

It need scarcely be repeated that the reasons which have led to such important developments in Great Britain apply with equal force here.

In order to maintain and replenish the fish supply two things are necessary—the prevention of wholesale and useless destruction, and the establishment of hatcheries. As regards the former, it is a matter for congratulation that a Bill is now before Parliament which proposes to consolidate and amend the existing Acts, and thereby to take more stringent measures for the preservation of fish life. The Bill provides for the following additions, among others, to existing Acts, viz.:—To license fishermen, to compel fishermen to furnish returns, to forbid the sale of the roe of fish, to protect crayfish, to inflict penalties for disturbing fish on their spawning grounds, to give inspectors power to enter upon fishing grounds and boats, to examine nets, to prevent foreigners from fishing unless naturalised, to give power to the Minister to remove obstructions to the passage of fish, to pay for the destruction of shags and pelicans, and to provide spawning reserves and hatcheries. These are most important provisions, and if passed and carried into effect will do much to prevent the mischief which is now going on. The proclamation of spawning reserves and the protection of the shallow waters in our gulfs, inlets, and estuaries from indiscriminate net fishing, especially with certain kinds of net, are of the utmost importance, and the enforcement of the law should be vigorously insisted upon. A good deal has already been done in this direction, largely through the efforts of Mr. Duffield, but more is needed. It has been repeatedly shown that the shallow waters referred to are the natural spawning grounds of fish, and often their resort in the earlier stages of life, yet it is notorious that the creeks and inlets of the Port River, for instance, are being perpetually raked by seine nets, the nets being often placed at the mouths of creeks on a falling tide. The chief sinners in this respect are said to be unnaturalised foreigners, who take care not to expose for sale their illegal captures, but dispose of them privately among their own customers. Be this as it may, there are probably no places which should be more carefully guarded against depredations of this kind than the various branches of the Port River,

and the same thing holds good for such places as the estuary of the Onkaparinga, Port Wakefield, Port Pirie, &c., &c.

Whether the mischief to which I have referred is going on in defiance of the law or whether the law as it stands is insufficient to deal with it, I am unable to say, but in any case it is sincerely to be hoped that the new Bill will give ample power to check such outrages. Unless the Bill is carefully drawn and stringently enforced it will be of little use, and the depletion of the fish supply will inevitably go on. That the existing law is not enforced in some directions is apparent from the fact that in our public streets crayfish below the minimum legal size are sometimes exposed for sale, and that, too, in not inconsiderable numbers.

One other preventive measure calls for special mention, namely, the destruction of fish-eating birds. The efforts of the Bird Protection Society have, I am sure, the fullest sympathy of all right-thinking people, in so far as they are directed against the wanton destruction of beautiful and useful birds; but the fact cannot be overlooked that the advent of man has greatly disturbed the balance of nature and rendered necessary measures which seem at first sight highly undesirable. The fisherman has been added to the enemies of the fish, and, especially where his operations are ruthlessly destructive, his influence, added to that of the birds, has altogether disturbed natural conditions and proved too much for the survival of the finny tribes. It would seem to have become necessary, therefore, to take means for the destruction of such birds as shags and pelicans, which are known to devour enormous quantities of fish. It may be, judging from experience gained on British coasts, that even gulls may have to come under some measure of condemnation.

But matters have been allowed to go so far that preventive measures alone will prove inadequate to cope with the increasing depletion of the fish supply. It will be necessary, in addition, to provide for the replenishment of the supply by establishing fish hatcheries, which will not only hatch out young fish, but preserve them in the earlier stages of their life from their numerous enemies. Then when they have reached a certain stage they can be distributed in the open sea and safely left to their own devices. The Bill now before Parliament proposes to do something in this direction, but I doubt whether it proposes to do enough. The N.S.W. Government has made some attempt to establish hatcheries for sea fish both from our own seas and from British waters, Mr. Dannevig having brought with him a number of plaice and soles which have been placed in a protected place in Port

Hacking. I fear, however, from private information, that the scheme is likely to be starved owing to the reckless extravagance which has gone on in other directions. The N.S.W. scheme, you will observe, includes fish acclimatization, an experiment not yet tried, so far as I am aware, in Australasia except in the case of fresh water fish, but an experiment which may yield results of great interest and importance. You may not be aware of the extent to which fish hatching and the replenishment of sea fish has been carried in the Northern Hemisphere. Let me quote again from Mr. Dannevig's lecture: "Sea fish hatcheries have been established in America, Scotland, England, Newfoundland, Canada, and Norway, and the work accomplished from year to year in these various places is well worth noting. In 1898 the various hatcheries in the United States of America produced not less than 857,500,000 fry of different kinds of fish; in 1901 the Canadian hatcheries produced 203,500,000 of fry, while the single hatchery in Norway has been able to develop as many as 400,000,000 fry in one season." The writer in the "Contemporary" quotes a letter from one of the U.S. Fishery Commissioners to the following effect:—"The result obtained in this country by the artificial propagation of food fishes has not only been encouraging, but is phenomenal. No person informed on the subject now disputes the fact that the future of our fisheries must depend for its prosperity in a measure on artificial methods of hatching. The chad fishery, which has become depleted to a remarkable extent, has, by artificial propagation, steadily increased, and amounts to upwards of a million dollars a year, notwithstanding the fact that the abundance has made it possible for fishermen to sell at lower prices than formerly. These fish have been introduced on the Pacific Coast, where they were indigenous, and they have multiplied to such an extent along hundreds of miles of coast that they are now common fish in the markets. As regards the cod, it is only recently that this work has begun, but now they are found in enormous abundance in the neighborhood of our hatcheries in many places where they had never previously been seen in the memory of the oldest fishermen, and in such numbers that a profitable fishery has been maintained from them by a fleet of small vessels. The fishermen confidently look forward to seeing a fishery built up off the New England shore in the near future which will be beyond anything man now living ever witnessed." Surely statements such as these should awaken the powers that be to the possibilities of the future as regards the supply of cheap, wholesome food, to say nothing of the resulting increase in revenue

which would accrue and which is by no means to be despised.

So far I have dealt almost exclusively with sea fish, but in the Murray River there is a source of supply of great value which also is becoming fast depleted, and to which the same general statements are applicable. In October, 1900, Messrs. Stephens and McIntosh, Inspectors of Fisheries in this State, conducted an enquiry into the fisheries of the S.A. portion of the Murray, and a large amount of evidence was collected, which, unfortunately, was never published. It was reserved for the N.S.W. Government—to the disgrace of this State, be it said—to publish, from the pen of Mr. Dannevig, an able summary of the results of that enquiry. The evidence has been carefully and ably sifted and analysed by that gentleman, and his report is most interesting reading. It is clearly shown, after allowing for certain evidence given by some fishermen, evidently with a view to their own interests, that the spawning season is from September to November, that certain kinds of net, more especially the bag net, are fearfully destructive in their effects (and the same is true in a less degree and for different reasons of wire cages), and that birds and turtles are responsible for the destruction of large quantities of fish. It is further shown that fish hatcheries could be easily maintained and made very effective under the conditions which prevail in the Murray, and, lastly, that even in the present unsatisfactory condition of affairs considerable railway revenue is derived from the carriage of the fish. At a conference held in Melbourne in May, 1902, several resolutions were adopted recommending that the following steps, among others, should be taken to preserve the Murray fisheries:—

1. A close season for Murray fish and crustacea from September 1 to December 20 of each year.

2. Investigation by competent officials to ascertain the lowest weights at which codfish, perch, and lobsters are in full roe.

3. Imposition of licence fees.

4. Offering of rewards for the destruction of shags, pelicans, and turtles.

5. Establishment of a hatchery, the expense to be borne equally by New South Wales, Victoria, and South Australia.

The more important of these proposals are, I believe, included in the Bill now before Parliament, and a close season on the Murray has been declared during September, October, and November. Such evidence of the awakening of the authorities to the gravity of the situation is so far cause for satisfaction. That the situation is grave scarcely admits of

dispute, and were a little of the money annually spent in unprofitable ways devoted to the cause I am advocating, there would undoubtedly be not only a great increase in the supply of cheap, wholesome fish, but an accession to the revenue by no means to be despised. Doubtless some fishermen here and there would suffer, for the time being, but ultimately all would greatly benefit, and for the sake of these few it is surely a suicidal policy to endanger the whole future of the fishing industry. I notice that in the discussion in Parliament on the Fisheries Bill one gentleman expressed his belief that there is no immediate necessity to push on the measure. If he means that there is no immediate danger of the fish supply suddenly giving out he is doubtless right, but every year's delay means a change for the worse and increased expense and difficulty when the position has ultimately to be faced. The sooner this is realised by our legislators the better will it be for the Commonwealth of Australia.

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LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1903.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election

HONORARY FELLOWS.

1893. *COSSMAN, M., Rue de Maubeuge, 95, Paris.
1897. *DAVID, T. W. EDGEWORTH, B.A., F.R.S., F.G.S., Prof. Geology Sydney University.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Camberwell, Victoria.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Gov. Astron., the Observatory, Melbourne, Victoria.
890. *ETHERIDGE, ROBERT, Director of the Australian Museum of N.S., Wales, Sydney.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1892. *MAIDEN, J.H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, N.S. Wales.
1898. *MEYRICK, E. T., B.A., Elmswood, Marlborough, Wilts, England.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Gov. Astron., Sydney, N.S. Wales.
1894. *WILSON, J. T., M.D., Prof. of Anatomy, Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, S.A.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, N.T.
1893. *McKILLOP, REV. DAVID, Daly River Mission, N.T., Australia.
1886. NICOLAY, REV. C. G., Fremantle, W.A.
1883. *STIRLING, JAMES, Gov. Geologist, Victoria.
1893. *STRETTON, W. G., Palmerston, N.T., Australia.

FELLOWS.

1874. ANGAS, J. H., Collingrove, Angaston.
1895. *ASHBY, EDWIN, Royal Exchange, Adelaide.
1902. BAKER, W. H., Glen Osmond Road, Parkside.
1893. *BEDNALL, W. T., *Register* Office, Adelaide.
1887. *BLACKBURN, REV. THOS., B.A., Woodville.
1901. BOAS, J. H., B.Sc., Charters Towers, Queensland.
1886. *BRAGG, W. H., M.A., Prof. of Mathematics, University of Adelaide, S.A.

1883. BROWN, H. Y. L., F.G.S., Gov. Geol., Adelaide, S.A.
1882. BROWNE, L. G., Davenport Chambers, Currie-street, Adelaide.
1899. BROWNE, T. L., Marlborough Chambers, Waymouth-st., Adelaide.
1897. BROWNE, J. HARRIS, Adelaide.
1893. BRUMMITT, ROBERT, M.R.C.S., Gilberton.
1879. *CLELAND, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer in Materia Medica, University of Adelaide.
1895. CLELAND, JOHN B., M.D., Ch.B., Parkside.
1876. (L) COOKE, EBENEZER, Commissioner of Audit, Adelaide.
1895. COOKE, JOHN H., Edmund-street, Unley.
1887. *DIXON, SAMUEL, Bath-street, New Glenelg.
1896. DRUMMOND, J. H. G., M.D., Pangarinda, Semaphore.
1893. DUDLEY, URIAH, White Rock S.M., Drake, N.S.W.
1890. *EAST, J. J., F.G.S., Western Australia.
1902. EDQUIST, A. G., Hindmarsh.
1899. FERGUSSON, ANDREW, School of Mines, Adelaide.
1886. FLEMING, DAVID, 24, Buxton-street, North Adelaide.
1889. FRASER, J. C., Adelaide.
1880. *GOYDER, GEO., F.C.S., Analyst and Assayer, Adelaide.
1896. GREENWAY, THOS. J., Chillagoe, Queensland.
1896. HAWKER, E. W., F.C.S., Adelaide.
1899. *HIGGIN, A. J., Assist. Lecturer on Chemistry, University of Adelaide.
1891. *HOLTZE, MAURICE, F.L.S., Director Botanic Gardens, Adelaide.
1883. *HOWCHIN, WALTER, F.G.S., Lecturer on Geology and Palæontology, University, Adelaide.
1901. HASLAM, J. A., B.Sc., Registrar of the School of Mines and Industries, Adelaide.
1902. ILIFFE, JAS. DRINKWATER, B.Sc., Prince Alfred College, Adelaide.
1893. JAMES, THOMAS, M.R.C.S., Moonta, S.A.
1900. *JOHNCOCK, CHAS. F., Morphett Vale.
1902. JEFFREYS, GEO., School of Mines, Adelaide.
1899. KLEEMAN, RICHARD, the University, Adelaide.
1898. *KOCH, MAX, Port Pirie.
1884. LENDON, A. A., M.D. Lond., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine, the University, and Hon. Physician Children's Hospital, North-terrace, Adelaide.
1856. *LLOYD, J. S., Pirie-street, Adelaide.
1897. *LEA, A. M., Govt. Entomologist, Hobart, Tasmania.
1888. *LOWER, O. B., Broken Hill, N.S.W.
1874. MAYO, G. G., C.E., Tatham-street, Adelaide.
1897. *MORGAN, A.M., M.B., Ch.B., Angas-street, Adelaide.
1884. MUNTON, H. S., North-terrace, Adelaide.
1859. (L) MURRAY, DAVID, Adelaide.
1883. PHILLIPPS, W. H., Adelaide.
1886. POOLE, W. B., Savings Bank, Adelaide.
1892. *PRIESTLEY, P. H., Parkside.
1885. *RENNIE, EDWARD H., M.A., D.Sc. Lond, F.C.S., Professor of Chemistry, University of Adelaide.
1869. *RUTT, WALTER, Chief Assistant Engineer, Adelaide.
1891. SELWAY, W. H., the Treasury, Adelaide.
1893. SIMSON, AUGUSTUS, Launceston, Tasmania.
1857. *SMEATON, THOS D., Blakiston, S.A.
1900. SMEATON, STIRLING, B.A., C.E., Engineer-in-Chief's Office, Adelaide.
1871. SMITH, ROBT. BARR, Adelaide.

1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Professor of Physiology University of Adelaide, Director of S.A. Museum.
1886. *Tepper, J. G. O., F.L.S., Entomologist S.A. Museum.
1897. *Torr, W. G., LL.D., M.A., B.C.L., Brighton.
1894. *Turner, A Jefferis, M.D., Brisbane, Queensland.
1889. Vardon, Hon. Joseph, M.L.C., J.P., Adelaide.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics, University of Adelaide.
1902. Vandenbergh, W. J., Barrister and Solicitor, J.P., Pirie-street, Adelaide.
1883. Wainwright, E. H., B.Sc., Lond., St. Peter's College, Adelaide.
1878. Ware, W. L., J.P., Adelaide.
1859. Way, Rt. Hon. Sir Samuel James, Bart., D.C.L., Chief Justice and Lieutenant-Governor of South Australia, Adelaide.
1902. Woolnough, Walter George, B.Sc., F.G.S., Lecturer on Mineralogy and Petrology, University of Adelaide.
1886. *Zietz, A. H. C., F.L.S., C.M.Z.S., Assistant Director South Australian Museum, Adelaide.

ASSOCIATES.

1901. *Basedow, Herbert, Adelaide.
1901. Collison, Edith, B.Sc., Jeffcott-street, North Adelaide.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia

TWENTIETH ANNUAL REPORT OF THE COMMITTEE,

FOR THE YEAR ENDING 30TH SEPTEMBER, 1903.

Evening Meetings.—Eight evening meetings have been held, at which the undermentioned papers have been read :—

1902.

Oct. 28—Preparation of Natural History specimens, J. G. O. Tepper, F.L.S., and F. R. Zietz.

Dec. 16—The Fauna and Flora of South Africa, Capt. S. A. White.

1903.

April 21—British and Continental Museums, Dr. E. Angas Johnson; Natural History Notes from the South-East, Mr. Jas. Aitken.

May 19—(Paper postponed on account of inclement weather).

June 23—Gems and Precious Stones, W. G. Woolnough, B.Sc.

July 21—Australia's Great Artesian Basin, S. Smeaton, B.A.

Aug. 18—The Shape of Trees, J. G. O. Tepper, F.L.S.

Sept. 15—Annual Meeting.

The attendance at these meetings has been fairly well maintained. The subjects submitted at the evening meetings have been very varied, but Botany, Geology, and Zoology have been the most favoured. Some useful practical hints on the preparation and preservation of Natural History specimens have been furnished. Exhibits have, as usual, formed an interesting feature of the evening meetings.

Amongst these were included plants, shells, butterflies, minerals

aboriginal implements and ornaments, geological specimens from the River Inman, a special collection of flowers and grasses from Central Australia; kaolinized clay, which is likely to create a new industry in the finer branches of pottery-ware; Coorongite, denizens of the sea as well as fresh water pools, the flower of the Indian bamboo, and many other specimens.

The very handsome orchid, *Dipodium punctatum*, from Summertown, was shown as an exhibit at one of the meetings.

The members were indebted to Capt. S. A. White for a most interesting paper on the Fauna and Flora of South Africa.

Excursions.—There have been eleven excursions held during the year, of which the following is a list:—

1902.	LOCALITY.
Oct. 18	Coromandel Valley and River Sturt.
Nov. 8-10	(Three days) Blumberg and Mount Crawford, &c.
Dec. 13	Summertown (Mr. J. Johnson's Garden).
1903.	
March 28	Dredging, Port River.
April 18	The Grange.
May 16	Longwood Gully (clay deposits).
June 20	Black Hill.
July 18	Henley Beach to Glenelg.
Aug. 15	Blackwood.
Sept. 1	(Whole day) Houghton and Highercombe.
Sept. 19	Horsnell's Gully and Norton's Summit.

The most noteworthy of the above was the three days excursion in November, 1902, when Blumberg, Mt. Crawford, and the hills between Mt. Torrens and Norton's Summit, as well as the cyanide works at Mt. Torrens, were visited. Probably owing to the previous hot weather, not much was found in a botanical way, but the mineral country near Mt. Crawford and the S. Para River afforded much scope for interesting investigations. The pleasure of the excursion was enhanced by the hospitality of the Hon. John Warren, M.L.C., and Mr. Alex. Murray, as well as by the efforts of Mr. T. Pflaum and other Blumberg residents. The next longest trip was that to Longwood Gully, where the fine exposure of white clay deposit was a novel feature to most of the party. At the close of the afternoon inspection Mrs. and the Misses Tomkinson thoughtfully provided afternoon tea for the party. According to the season, the hills or seaside have been visited. The excursion to Houghton on Sept. 1, was a pleasant holiday trip, thanks largely to the assistance of Mr. H. J. Armitage. On the same occasion the courtesy of Mr. W. Goodwin in permitting the inspection of the fine old

property, known as Highercombe, added to the pleasure of th outing.

Black Hill has been revisited as well as Blackwood, the latter furnishing the best results so far as the collecting of orchids is concerned. On this occasion the Section was indebted to a former chairman, Mr. E. Ashby, for his guidance and hospitality. Ornithology, neither at the indoor nor outdoor meetings, has received much attention during the year, a separate organization now dealing with that branch of Natural History. Conchology has not been neglected, and a dredging trip was also included in the list of excursions. The members had a change from their usual researches into Nature in its wild state when they visited the extensive market garden of Mr. J. Johnson, of Summertown, who to a practical object lesson in successful vegetable growing, added an equally practical exhibition of rural hospitality. Except when adverse weather conditions prevailed, the attendance at the excursions has been well sustained.

Native Fauna and Flora Protection.—A separate report is presented from this Committee, and it is gratifying to observe that the kangaroo is being again protected on Kangaroo Island, this time for a period of five years.

Rules.—Owing to the Incorporation of the Royal Society the Rules of the Section had to be submitted for approval. and those already in print were accepted by the parent body with slight modification as to the constitution of the committee.

Obituary.—The Committee record with much regret the death (on 2nd December, 1902) of Mr. J. W. Bussell, who was a member of the Section almost from its inception, had held office as Vice-Chairman and Auditor, and frequently assisted by the loan of his microscope and lantern.

Financial.—The receipts from subscriptions have been £14 10/, and the disbursements amount to £11 6/. The former sum has been handed over, in conformity with the rules, to the Royal Society, which has given the section a grant of £10. There are rather more arrears of subscriptions due than usual, and members would save the Hon. Secretary time and trouble if they would remit more promptly the small sum charged as subscriptions to the Section.

Membership.—There has been a greater acquisition of new members than for some years past, while considerably fewer names have been struck off during the year. The number now on the roll is 74.

E. Angas Johnson, Chairman.
W. H. Selway, Hon. Secretary.

Adelaide, 14th September, 1903.

FIFTEENTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Attention having lately been directed to the destruction of kangaroos upon Kangaroo Island since the expiration of the term of years during which they were protected, your Committee were pleased to see a statement that in Executive Council, on Wednesday, 9th September, a proclamation was made, further protecting these animals for a period of five years.

Mr. Herbert, M.P., has lately introduced a Bill for the Amendment of the Birds Protection Act, to authorise the alteration of the close season for the Northern Territory, which now is the same as that for South Australia proper, while the breeding seasons for birds in the North and South differ greatly, and your Committee (hoping there may be an opportunity of introducing some further amendments, enabling land owners, who desire to do so, to fully protect the birds on their property from injury or destruction by trespassers) are taking steps accordingly.

EDWIN ASHBY, Acting-Chairman.
M. SYMONDS CLARK, Hon. Secretary.

Adelaide, September 14, 1903.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND PAYMENTS FOR THE YEAR 1902-3.

Dr. Receipts.	£	s.	d.	Cr. Payments.	£	s.	d.
To Balance brought forward	5	11	5	By Postages	4	5	0
" Subscriptions	14	10	0	" Printing, &c.	4	1	6
" Grant from Royal Society	10	0	0	" Compensation for Loss of Dredge	1	5	0
				" Attendance	1	0	0
				" Advertising	0	14	6
					11	6	0
				" Subscriptions as per contra paid over to Royal Society	14	10	0
				" Balance in hand	4	5	5
	£30	1	5		£30	1	5

Audited and found correct.

J. S. LLOYD, }
WALTER D. REED, } Auditors.

Adelaide, 14th September, 1903.

W. H. SELWAY,
Hon. Secretary and Treasurer.

MALACOLOGICAL SECTION.

ANNUAL REPORT FOR 1902-3.

The membership of the Section numbers 13, showing an increase of one during the year. Twelve meetings have been held. The work done has included a revision of the existing lists of South Australian mollusca. The classification followed has been that of the latest (English) edition of Zittel's Palæontology. The lamellibranchs and scaphopods have been passed in review, consideration of the amphineura has been deferred, and the Section is now dealing with the gastropods.

The officers elected for 1903-4 are Dr. Verco, Chairman, and R. J. M. Clucas, Hon. Secretary.

ROBERT J. M. CLUCAS, Hon. Secretary.

November 27, 1903.

Royal Society of South Australia

(INCORPORATED).

RULES.

Name.

1. The title of the Society is the "Royal Society of South Australia (Incorporated)."

Objects.

2. The objects of the Society are the promotion and diffusion of science by meetings for the reading and discussion of papers and other methods.

Constitution.

3. The Society shall be constituted of the persons whose names have been duly enrolled as members, and who have not ceased to be members.

4. His Excellency the Governor of South Australia for the time being shall be requested to be the Patron of the Society.

5. Members shall be classed as Fellows, Honorary Members, Corresponding Members and Associates.

Management.

6. The general management of the affairs of the Society, together with the custody of its property, shall be vested in a Council of eleven Fellows, comprising a President, two Vice-Presidents, a Treasurer, a Secretary, and six other Fellows to be elected as hereinafter provided.

7. The exercise of any power vested in the Council may be controlled by the Society in general meeting.

8. Four members of the Council shall form a quorum, and may transact any business which the Council is authorised to transact.

9. In addition to any other powers hereby conferred upon them the Council shall—

Convene all meetings of the Society and determine what papers are to be read, and generally what business is to be transacted at such meetings:

Determine as to the publication in whole or in part of any paper so read:

Elect a member of Council to represent the Society on the Board of Governors of the South Australian Public Library, Museum, and Art Gallery of South Australia:

Receive the revenues and other moneys of the Society, and apply the same in furtherance of its objects, or as may be specially directed by the Society:

Provide for the safe custody of the seal, the original papers, and all other property of the Society:

Enter into and execute all contracts and engagements of the Society:

Prepare the annual report and balance-sheet:

Regulate the meetings of the Council as a majority thereof shall determine.

Members.

10. Members may be elected as hereinafter provided.

11. Fellows and Associates shall pay such subscriptions as may be prescribed.

12. Persons distinguished for their attainments in science may be elected as Honorary Members.

13. Persons who ordinarily reside more than ten miles from Adelaide, and who, by furnishing papers, or otherwise, have, in the opinion of the Council, promoted the objects of the Society, may be elected Corresponding Members.

14. Honorary Members and Corresponding Members shall not be liable for subscriptions.

15. Young men of not more than twenty-one years of age and ladies may be Associates.

Election of Members.

16. Every candidate for membership must be nominated in the prescribed form by two Fellows.

17. The nomination paper shall be lodged with the Secretary with the prescribed subscription (if any), and shall be submitted to the Council and the Society at their first following meetings, and the election shall be held at the next subsequent meeting not being a special meeting of the Society.

18. No person shall be eligible for election as an Honorary or Corresponding Member unless recommended by the Council.

19. Elections shall be by ballot, one negative in six excluding.

20. A candidate who has been so excluded shall not be eligible to be again nominated within one year of such exclusion.

21. An Associate shall be entitled to be enrolled as a Fellow upon signing an application in due form and paying the prescribed subscription.

22. Every person admitted shall have immediate notice thereof transmitted to him by the Secretary, accompanied by a copy of the rules, and shall be enrolled as a member.

Cession of Membership.

23. A member may resign his membership at any time by notice in writing to the Secretary, and shall thereupon cease to be a member.

24. If any Fellow or Associate whose subscription shall be more than twelve months in arrear shall fail to pay the same after application in writing by the Secretary therefor, the Council may cancel his membership, and he shall thereupon cease to be a member.

Restoration.

25. The Council may upon such terms as it shall think fit re-enrol as a member any person who shall have ceased to be a member.

Election of Council.

26. At each annual meeting the President and all other officers (except the Secretary) and two of the Fellows on the Council shall retire from office, and their places shall be filled by election, which if any Fellow shall so require shall be by ballot.

27. The Fellows to retire shall be those who have been longest in office since last election, or, in case of equal tenure of office, shall be decided by lot.

28. The Secretary shall hold office during the pleasure of the Society.

29. Retiring officers and Fellows shall be eligible for re-election.

30. If a member of the Council shall without leave or some reason which the Council shall consider sufficient absent himself from three consecutive meetings of the Council he shall be deemed to have vacated his office.

31. Every casual vacancy in the Council shall be filled up at the next meeting of the Society by election by ballot.

Seal and Sealholder.

32. The Common Seal shall have the name of the Society inscribed upon it, and shall be held by the Secretary, who

shall for the purposes of the Act be deemed to be the Seal holder.

The Council shall have power to use the seal in the execution of any powers hereby vested in them or otherwise in relation to the affairs or business of the Society. The seal shall never be used except by the authority of the Council. At least two members of the Council and the Secretary shall sign every instrument to which the seal is affixed.

Meetings of the Society.

33. A meeting of the Society, to be called the Annual Meeting, shall be held in the month of October in every year upon a day and at a place to be appointed by the Council.

34. At the annual meeting the Council shall submit a report and duly audited balance-sheet, and the meeting shall elect the officers and members of Council for the ensuing year and transact any other business of which due notice has been given.

35 The Council may convene an ordinary meeting of the Society at any time.

36. The Council may at any time, and shall upon the requisition in writing of seven Fellows, specifying the purpose for which the meeting is required, convene a special meeting of the Society. The special business for which the meeting has been convened, and none other, shall be transacted at such meeting.

37. A Fellow may introduce two visitors at any meeting, other than a special meeting, upon entering their names in the visitors' book. Visitors shall not speak unless invited to do so by the Chairman.

38. Honorary and Corresponding Members and Associates shall not be entitled to vote at any meeting or take part in the business of the Society.

39. Seven Fellows shall be a quorum. If at any meeting a quorum is not present within thirty minutes after the hour of meeting, the meeting shall stand adjourned to a day and time to be appointed by those present, not being earlier than seven days. At the adjourned meeting the Fellows then present may proceed to business although a quorum may not be present.

40. Three day's notice at least shall be given of every meeting or adjourned meeting and of the principal items of business to be transacted thereat.

41. Notice shall be given to the members resident in South Australia by circular or in such other manner as may be prescribed.

Auditor.

42. Two Fellows not being members of the Council shall be chosen at some meeting of the Society prior to the annual meeting in each year to audit the accounts and balance-sheet for the then current year.

By-laws.

43. The Council may make, repeal, alter, and vary by-laws for regulating the—

Subscriptions to be paid and the officers to whom they are to be paid:
Forms to be used:
Procedure at meetings:
Requisites of papers to be read at meetings:
Notice to be given of meetings:
Encouragement to be given by the Society by means of medals, prizes, or otherwise for the promotion of science:
Determine the duties of the Treasurer, Secretary, and other officers:
And generally for the better carrying out the objects and purposes of the Society.

44. No by-law or repeal, alteration, or variation of any by-law shall have any validity unless approved by a majority of the Fellows present at a meeting of the Society of which due notice has been given.

45. The Society may by a majority of at least two-thirds of the Fellows present at an annual meeting or at any special meeting duly convened for the purpose make any rule or repeal, alter, or vary any existing rule.

46. In the construction of the rules of the Society, unless the subject or context requires a different meaning:

"Prescribed" means prescribed by by-law:
Words denoting the singular number only shall be deemed to include the plural and vice versa. Words denoting the masculine gender shall be deemed to include the feminine.

47. All rules and by-laws of the Society heretofore in force are hereby repealed.

BY-LAWS.

Section I.—Subscriptions.

1. Fellows shall subscribe £1/1/ per annum.

2. A Fellow may at any time compound for future annual subscriptions, exclusive of that for the current year, by the payment of fifteen guineas.

3. Associates shall subscribe five shillings per annum.

4. All subscriptions shall be payable in advance immediately after the annual meeting to the Treasurer, who shall give a receipt for the same on a printed form.

Section II.—Meetings of the Society.

1. Meetings shall be held on the first Tuesday in each month, at 8 p.m., in the Society's Rooms, unless the Council shall otherwise decide, and shall be convened by circular posted to the last known address of the members resident in the State. The circular shall state the subjects to be brought before the Society the names of candidates for membership, and any notices of motion.

2. The President, or, in his absence, one of the Vice-Presidents, shall take the chair; and in the event of the absence of all the above the members present shall elect a Chairman.

3. The business shall be transacted in the following order, unless it be specially decided otherwise by the meeting:

(*a*) Reading and confirmation of the minutes of the last meeting.
(*b*) Election of members.
(*c*) Nomination of candidates for membership.
(*d*) Consideration of motions of which notice has been given.
(*e*) Reading of notices of motions for subsequent meetings.
(*f*) Consideration of any special matters which members may desire to bring forward, subject to the approval of the Chairman obtained before the commencement of the meeting.
(*g*) Any other business brought forward by the Council.
(*h*) Exhibits and papers notified in the circular. (These shall be called on not later than half-past 8, unless otherwise decided by the meeting.)

Section III.—Papers.

1. No paper shall be read at any meeting which has not been previously approved by the Council, and every paper read before the Society shall be the property thereof, and immediately it has been read shall be delivered to the Secretary, and shall remain in his custody.

2. The Council shall decide whether any paper shall be printed. If not printed, either in whole or in part, it shall be returned to the author if he so desire.

3. All papers and other contributions printed in the Society's Transactions shall be subject to editing by an editor appointed by the Council.

4. The author of any paper printed by the Society shall be entitled to receive 25 copies free of cost, and may obtain additional copies on payment of cost of printing the same.

Section IV.—Sections.

1. With the consent of the Council, Sections may be formed in connection with the Royal Society for the special study of particular branches of natural or applied science.

2. Such Sections shall consist of—

(*a*) Members of the Royal Society who join the Section and pay the annual subscription to the Section.

(*b*) Other persons who have been regularly elected, and who pay the annual subscription to the Section.

3. Members of the Royal Society who join any Section shall not be required to pay any entrance-fee, and the annual subscription paid by them shall not exceed one-half of that paid by non-members of the Society

4. Each Section shall elect its own Committee of Management.

5. The President and Vice-Presidents of the Royal Society for the time being shall be *ex officio* members of the Committee of Management of all Sections.

6. The rules and regulations for the management of Sections shall not have any effect until they have been formally approved by the Council of the Royal Society.

7. Subscribers to the Sections shall have access to the library of the Royal Society, subject to such regulations as may be made by the Council.

8. The Committee of Management of each Section shall, on or before September 30 of each year, furnish to the Council

of the Royal Society an annual report of the proceedings of the Section, with a balance-sheet for publication (subject to the approval of the Council) in the Society's annual volume. A copy of such report and balance-sheet shall be given to each member of the Section whose subscription for that year has been paid.

9. Sections shall be allowed the use of the Society's room at such times as may be approved by the Council.

10. All subscriptions received by any Section shall be paid to the Treasurer of the Society on or before September 30 in each year.

11. Grants of money may be made by the Council to any Section out of the general funds of the Society.

(Signed) THOS. BLACKBURN,
Vice-President.

June 16, 1903.

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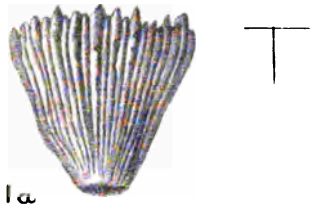

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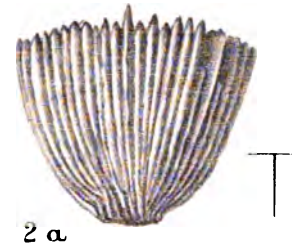

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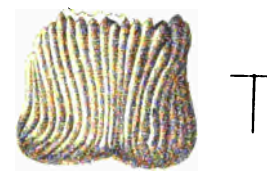

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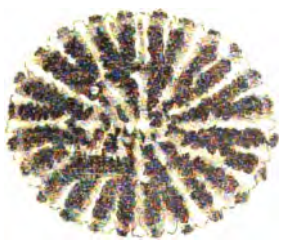

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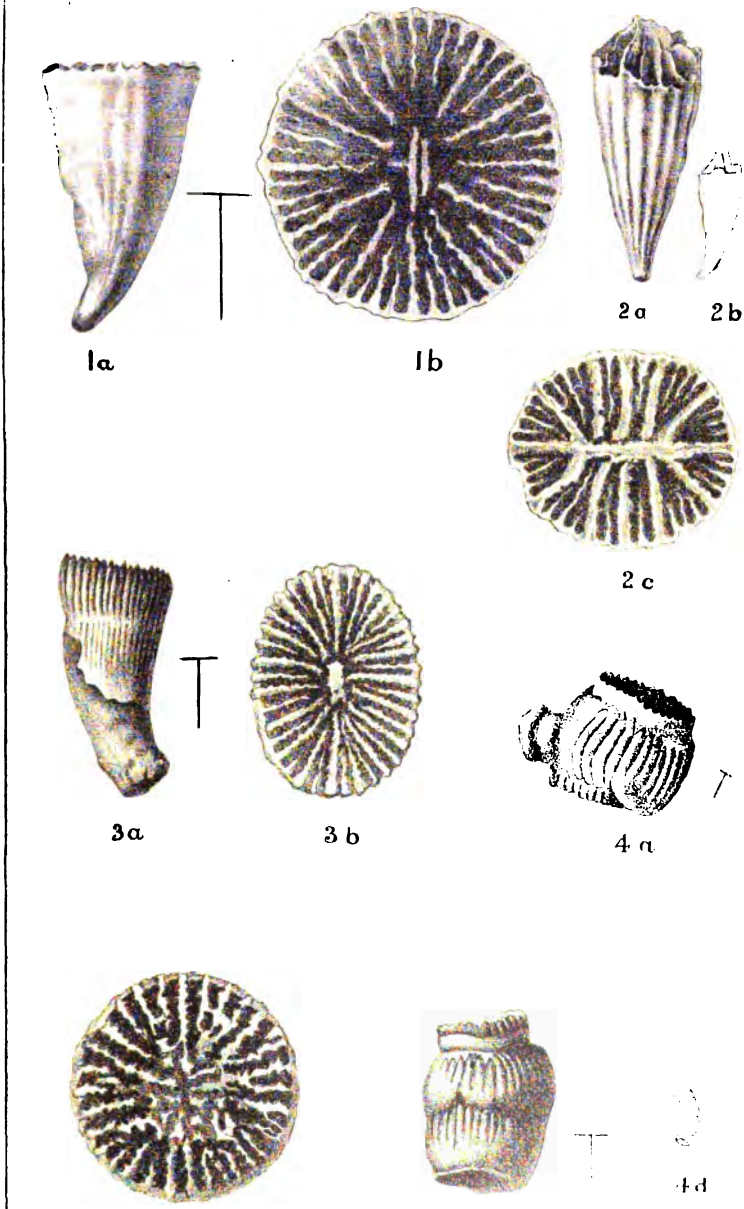

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TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA

(INCORPORATED).

VOL. XXVIII.

[WITH FORTY-FOUR PLATES.]

EDITED BY WALTER HOWCHIN, F.G.S.

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W. C. RIGBY, 74, KING WILLIAM STREET.

DECEMBER, 1904.

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Recent Corals from the South Australian and Victorian Coasts.

By John Dennant, F.G.S.

[Read April 7, 1904.]

Plates I. and II.

About three years ago I was requested by Dr. Verco to determine the corals from his dredgings in St. Vincent and Spencer Gulfs. The material forwarded to me comprised also numerous polyzoa and echinoderms. The former I handed to Mr. C. M. Maplestone, who has already described several new species contained in the dredgings. The echinoderms have been placed in the hands of a specialist, and will, I trust, be dealt with shortly. The present communication treats of the corals in Dr. Verco's collection, together with a restricted Victorian species handed to me by Mr. Mulder. Several of the South Australian corals occur also in Victorian waters.

Of the eleven species to be considered, six are new, and the remaining five have been previously figured and described by various authors.

The occurrence of a recent species of Tenison Woods' tertiary genus *Trematotrochus* is of especial interest, as it emphasises the close relationship which exists between the living fauna of the Australian seas and the earlier one disclosed by the fossils of the tertiary period. This genus is purely Australian, and includes species in which the wall is actually perforate, together with others where the intercostal spaces, though fenestrated in the same manner, have the internal theca entire. Such being the case, the broad distinction usually made between perforate and non-perforate corals breaks down. The wall of a perforate *Trematotrochus* is analogous to the base of *Stephanocyathus*, but its calice is *Turbinolian* in character. The imperforate species of the genus have similar calices, and externally a precisely similar wall.

Another Australian genus, *Holcotrochus*, is represented in the collection by two species, one of which is also recorded from the Muddy Creek tertiaries.

The genus *Platytrochus* was long supposed to be restricted to the Eocene of Alabama; but it is now recognised as both tertiary and recent in Australia, one species being common to the two horizons. Duncan, in his "Revision of the Madreporaria," mentions with a query the Australian seas as a locality for the genus; but on what authority I have been unable to ascertain. Vaughan copies Duncan's remark, though on another page he states that *Platytrochus* is an extinct genus.*

* Coral Fauna of the United States. Washington, 1900.

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The collection contains a single example only of this remarkable coral. Like its congener, it was dredged in Backstairs Passage at a depth of 22 fathoms.

Genus Platytrochus, Milne Edwards and Haime.

Platytrochus hastatus, Dennant. R. S. S. A., vol. xxvi., pp. 257-8. Pl. v., fig. 2.

The recent coral can be exactly matched among the fossil representatives of the species from the Spring Creek, Muddy Creek, etc., tertiary beds. The fossils show a slight variation among themselves in the slope of the spear-like projection at the base, but the seven examples of the living form are more uniform in this respect. The latter were dredged in Backstairs Passage at 22 fathoms.

Platytrochus compressus, Tenison Woods, *sp.* Pl. i., figs. 3*a*, *b*.
Conocyathus compressus, Tenison Woods, Linn. Soc., N.S.W., vol. ii., pp. 302-3, pl. v., fig. 1.

The examples, 22 in number, of this coral were dredged in St. Vincent Gulf, Backstairs Passage, and Investigator Straits at 15 to 22 fathoms. Actual comparisons with Woods' type from Port Stephens, N.S.W., show that they belong to his species, which must, however, be placed under *Platytrochus*, and not *Conocyathus*. The supposed pali are the papilli of the columella, which, as in *Platytrochus* generally, invade the lateral boundaries of the fossa. The calice is more narrowly elliptical than Woods' drawing indicates, and instead of the 48 septa shown, it really contains 54.

The South Australian examples vary in size, probably according to age. Several correspond with the type in dimensions as well as in the number of septa, etc., but others, though larger, are proportionally narrower. I redescribe the species, and also figure a full-grown individual.

The corallum is wedge-shaped and much compressed, especially inferiorly. Its sides and edges slope gradually to the base, which in most individuals terminates in a short stalk-like pedicel. There is no trace of adherence.

The calice is shallow, very narrow, and not truly elliptical, as its long sides are straight or sometimes even bend a little inwards, but laterally, that is, at the ends of the major axis, it is regularly curved. The summits of the short axis are usually higher, and often much higher, than those of the long axis. In the calice figured, these axes are in the ratio of 100 to 42.

The septa are exsert, finely granular on their sides, and vary in number from 52 in the smallest to 69 in the largest specimens. There are apparently four cycles and ten systems, of which the

extreme lateral ones are incomplete in regard to some septa. The primaries and secondaries are stout, sub-equal, and larger than the rest, which diminish according to order. According to Woods the septa are arranged in six systems, but I cannot so interpret the calice of any specimen. The columella is longitudinal and consists superiorly of numerous irregularly shaped papilli, which are sometimes, but not uniformly, arranged in three parallel rows. In a damaged specimen some papilli are broken off and the columella beneath is almost solid, and united to the septa.

The costæ correspond to the septa, and are rounded, smooth, and glistening, with narrow but deep interspaces. The primaries and secondaries reach the extremity of the base, near which they are joined by the tertiaries: the latter again are joined by the quaternaries at varying heights on the wall. The more central costæ become gradually narrower and the lateral ones broader towards the base. The costæ of the edges are perhaps on the whole slightly broader than those in the centre of the flat sides. The wall is thin and there is no epitheca.

The large specimen figured is 12 mm. high, and its calice is 9·5 mm. long and 4 mm. broad.

The fossil analogue of this coral is *P. Airensis, mihi*, which, however, is smaller and less compressed; its septa also are more regularly developed and fewer in number.

Genus Trematotrochus, Tenison Woods.

Trematotrochus Verconis, *spec. nov.* Pl. i., figs. 4*a*, *b*.

This small coral is cuneiform and compressed, with a rounded base. Its calice is shallow and elliptical, with the major and minor axes in the proportion of 2 to 1.

The septa are exsert, granular, and in six unequal systems with four cycles. In the two central systems the principal orders are stout and equal, and increase slightly in thickness from the margin to the columella; the quaternaries are shorter, much smaller, and taper from the wall inwards. The four lateral systems are incomplete, and the septa relatively smaller, except the primaries, which are of full size. The calice figured contains 46 septa, and that of a young individual 40; in the latter the quaternaries consist of slender points only.

The columella is essential and longitudinally placed. Superiorly, it is free and nodular, but solid inferiorly, and then fused to processes from the principal septa.

The costæ, which are continuations of the septal orders, are stout and equal, broadest centrally, and narrow in the lower portion of the corallum. On the flat sides nearly all reach the base, but laterally the quaternaries join the tertiaries about midway

on the wall. The interspaces are equal to the costæ in breadth and are regularly crossed by thin transverse bars, which give the corallum the fenestrated appearance characteristic of *Trematotrochi*. The wall is stout, and from a dissected specimen I conclude that it is not really perforate, the pore-like cavities being confined to the external portion of the theca. The wall of the recent coral is thus constructed on the same plan as *T. Kitsoni* and *T. declivis*, fossil species of the genus.

The dimensions of the type are—Height of corallum, 7·5 mm.; length of calice, 6 mm.; breadth of calice, 3 mm. Another example is of equal size, but the rest are smaller. The majority of the specimens are much worn, and were, no doubt, dead corals when collected. They were dredged in St. Vincent Gulf and Backstairs Passage at depths ranging from 15 to 22 fathoms.

Genus Deltocyathus, Milne Edwards and Haime.

Deltocyathus Vincentinus, *spec. nov.* Pl. ii., figs. 1*a*, *b*, *c*.

The corallum is discoid when young and with age becomes shortly cylindrical. The under surface is horizontal or slightly concave, and there is sometimes a small central protuberance. Traces of adherence are common in young examples, and one or two are still attached by the entire base. Quite rarely is there any scar of former attachment on the base of older corals. The wall is perpendicular, or nearly so.

The calice is circular in outline and flat rather than convex from its margin to the abruptly sunken central fossa. The septa are in six systems with four cycles. They have sharply serrated edges, and their sides are marked by parallel rows of pointed granules perpendicularly arranged. They vary in size from the long, stout primaries to the short and comparatively slender quaternaries. The primaries only are free and the rest form six deltoid combinations. All are exsert and rise in arched crests, which differ in height according to order. At the central fossa the primaries extend both inwards and upwards beyond the more gradually arched secondaries and tertiaries. The latter are doubly curved and unite before the enclosed secondary in the manner characteristic of *Deltocyathus*. The quaternaries bend towards and then join the tertiaries about half-way from the margin. The junction of the septa is barely noticeable in perfect examples, like the fine one figured, but when the upper surface becomes worn, as in dead corals, their union is plainly seen.

Conspicuous lobed pali are placed before the primary and secondary septa, and are connected with them by sunken processes; their central ends are fused with the columella. The latter is solid below and superficially either papillary or trabecular.

The costæ are direct continuations of the septa, and, therefore, also in six systems, with four cycles. They are broader than these, sub-equal and prominent on the wall, and with deep interspaces. Their edges are serrated, but less strongly than those of the septa. Curving sharply round inferiorly, they are continued on the base, where they converge from its circumference to the centre, and gradually diminish in breadth. The same deltoid combinations also occur, the primary costæ being free, while the remaining orders unite like the corresponding septa of the calice; the primaries and secondaries reach the centre as very fine lines.

The examples vary much in size. The largest in the collection is 11 mm. in diameter and 5·5 mm. high. From this there are all gradations to the very smallest, which are nummiform in shape and between 3 mm. and 4 mm. in diameter. The type, a comparatively large specimen, is 9 mm. in diameter and 4·5 mm. high.

Examples of this coral were dredged in all but two of the fourteen stations mentioned by Dr. Verco, and generally in great abundance. The depths given range from 9 to 22 fathoms.

The only described species with which it is necessary to compare the present coral is *Deltocyathus Italicus*, Edwards and Haime. As a recent form this is only known to me from the descriptions given by Pourtales, Lindström, and Moseley; but the fossil coral from Cape Otway, identified by Duncan as *D. Italicus*, var. *Australiensis*, is well represented in my collection. As Duncan states, it is in the shape of a very short cone—which agrees with Edwards and Haime's figure of the type specimen from the Tortona miocene. The drawings of recent examples of the same species, as given by the three authors mentioned, indicate also a conical-shaped coral; whereas *D. Vincentinus* is cylindrical, with a flat base and a low, perpendicular wall.

ASTRÆIDÆ.

Genus Homophyllia, Brüggemann (1877).

Duncan, in his "Revision," makes this genus a synonym of *Antillia*, which he established in 1863 for the reception of some West Indian corals; but Brüggemann had already pointed out that *Homophyllia* was distinguished from Duncan's genus by its circular development, attachment, thin epitheca, the dentate character of its septa, and the small columella. Professor Gregory, who has examined Duncan's West Indian corals, doubts the validity of *Antillia*, and divides its species among *Lithophyllia* and *Circophyllia*.* On account of its scanty endotheca, as well as other peculiarities, the species for which *Homophyllia* was founded, viz., Milne Edwards and Haime's *Caryophyllia australis*, cannot enter either of the genera mentioned, and

* Q.J.G.S., Vol. LI. (1895), p. 200.

should, I think, remain where Brüggemann placed it. I observe, however, that its calice is not invariably circular, but sometimes elliptical.

Homophyllia australis, Milne Edwards and Haime, *sp.*
Pl. ii., fig. 2.

Caryophyllia australis, Milne Edwards and Haime, Ann. Sci. Nat., Ser. 3, Zool., Vol. x., p. 320, Pl. viii., fig. 2.
Homophyllia australis, Brüggemann, Ann. Nat. Hist., Vol. xx., p. 310.
Homophyllia australis, Tenison Woods, Linn. Soc. N.S.W., Vol. ii., pp. 321, 322.
Cylicia magna, Tenison Woods, Linn. Soc. N.S.W., Vol. ii., pp. 325-6, Pl. iv., fig. 3.
Homophyllia (Isophyllia) australis, Quelch, "Challenger" Rep., Zool., Vol. xvi., p. 22.

In connection with this synonymy the following remarks by Dr. Brüggemann are quoted:—"Milne Edwards has mistaken this coral for the young of a West Indian *Isophyllia;* the description of *Isophyllia australis* (Hist. Nat. Cor., Vol. ii., p. 375) has nothing to do with the species under consideration."

There are eight well grown examples of *H. australis* in the South Australian gatherings and others have been dredged in Port Phillip Bay. A worn specimen was also picked up by Mr. Theile on a raised beach at Altona. All are solitary and have always been so. Dr. Brüggemann speaks of neighboring specimens touching each other and becoming intimately united by their sides, but I have never observed such union. Possibly they may sometimes be found on the same piece of rock, but with one exception all those I have seen are independent specimens. Small pieces of bivalve shells, polyzoa, serpulae, etc., are in adult forms still adherent to the base, which is usually much smaller than the calice. A very young example is almost immersed in a polyzoan fragment. The exception just mentioned refers to a young individual which is fixed by its base to the side of the large and perfect specimen figured, but the attachment is merely accidental.

Specimens of this coral from St. Vincent Gulf were forwarded many years ago to the late Tenison Woods for identification, but he did not recognise its identity with Edwards and Haime's species, and redescribed it as new under the name of *Cylicia magna.* In the article containing this description he had already quoted in detail Brüggemann's account of *H. australis*, but, as he makes no reference to the figure given by Edwards and Haime, I presume he had not consulted it. That Woods was uncertain as to the generic position assigned to his species is evident from his concluding remarks. He says, for instance, that Professor Tate, from whom he received the specimens, has not recorded anything of the stolon or mode of increase. There is of course no stolon, the coral being, as Dr. Brüggemann observed, solitary at all ages.

Genus Cylicia, Milne Edwards and Haime.

Cylicia rubeola, Quoy and Gaim., *sp.*

Dendrophyllia rubeola, Quoy and Gaim., Voy. de l' Astrolabe. Zooph., p. 97, Pl. xv., fig. 12-15.
Angia rubeola, Edwards and Haime, Ann. Sci. Nat., 3rd ser., t. x, Pl. vii., fig. 6, et t. xii., p. 176.
Cylicia rubeola, Tenison Woods, Linn. Soc. N.S.W., Vol. ii., pp. 324-5.

This coral is largely represented in Dr. Verco's dredgings and it is abundant also in Port Phillip Bay. As a fossil species it has been recorded by Professor Tate from the Older Pliocene of South Australia.*

Genus Plesiastræa, Milne Edwards and Haime.

Plesiastræa proximans, *spec. nov.* Pl. ii., figs. 3*a*, *b*.

The corallum is convex and longer than broad; both its upper surface and sides are covered by crateriform calices, which are so closely packed that the wall between is barely visible. It increases by intercalicinal gemmation. The base is broad and incrusting. On its edges the exotheca, or common plateau of the corallum, is marked by strong wavy lines which are continuations of the costæ of the marginal corallites. The calices are either circular or slightly elliptical, and, though widely open, are not shallow. There is a well marked trabecular columella at the bottom of the fossa.

The septa are in four cycles and six systems, but these are rarely complete. In the calice figured there are 35 septa. All are strongly dentate on their edges and finely granular laterally. The principal orders are stout and sub-equal; while those of the fourth order are short and slender. Some of the lamellæ in one calice may pass over the wall and continue into the next; usually, however, the junction of adjoining calices has a confused appearance owing to the outer ends of their septa meeting at an angle. The pali are long, prominent, lobed, and dentate, and placed before all orders except the last. Their upper projecting edges are free, a wide and deep sulcus separating them from the septal ends; but lower down the two structures are connected by thin processes. The endotheca is scanty and mostly confined to the neighborhood of the columella.

The corallum is 13 mm. high, 19 mm. long, and 10 mm. broad. One of the circular calices measured is 5 mm. in diameter. The single example obtained was dredged in St. Vincent Gulf, at a depth of 22 fathoms.

This species differs in shape, as well as in other respects, from the common *Plesiastræa* found in Port Phillip Bay. The latter is probably identical with *P. Urvillei*, Edwards and Haime.

* R.S.S.A., Vol. xiii., p. 173.

EUPSAMMIDÆ.

Genus Balanophyllia, Searles Wood.

Balanophyllia dilatata, *spec. nov.* Pl. i., figs. 2*a*, *b*.

The two examples of this species are attached to what is probably the lower encrusting portion of the thallus of Lithothammion. Enclosed by the same, or built into it, there is evidence of foraminiferal tests; while its surface shows small patches of polyzoa. The coralla are about 10 mm. apart, but the widely spreading base of one of them slightly overlaps that of the other. The latter corallum (the figured example) is intact; but the former is fractured longitudinally, and the structure of its columella and septa is thereby well disclosed. The habitat of the specimen cannot be definitely given, but as Mr. Mulder found it amongst the dredgings of the late Bracebridge Wilson, together with *Rhizotrochus radiatus*, *Cylicia rubeola*, and other organisms common in Port Phillip Bay, there is, I think, no reason to doubt that it came from that locality.

The corallum is sub-cylindrical and not much compressed, of moderate height, and attached by a large spreading base with a slight constriction immediately above it. The costæ are separated by narrow interspaces, and consist of raised double lines with minute spines on their surfaces and numerous central pores; the interspaces are also porous. The fractured example has a thin granular epitheca on the base and the lower fourth of the wall; but the other shows no vestige of this covering. The calice is elliptical and deep. The columella is large, longitudinally placed, porous, and trabecular rather than spongy.

The septa are in six systems and four cycles. All are perforate, and have dentate margins. The longest and most conspicuous septa are the quaternaries next the primaries in each system. They describe a double curve, and almost meet in front of the enclosed secondary. Here they are connected by a short, horizontal, tabula-like process, and, still continuing, each curves again outwards towards the corresponding quaternary of the adjoining system, and meets it in front of the primary, which is thus enclosed by the long quaternaries on either side. The remaining quaternaries in each system are short, and, curving towards the long ones, join them in front of the still shorter tertiaries at a third to a half from the wall. The primaries and secondaries are stout in comparison with the rest, which are slender and sub-equal.

The corallum is 10 mm. high, and the calice is 9 mm. long and 7 mm. broad.

EXPLANATION OF PLATES.

Plate I.

Fig.

1. *Rhizotrochus radiatus*—*a*, corallum, natural size; *b*, calice, magnified 1·5 diam.
2. *Balanophyllia dilatata*—*a*, corallum, magnified 2 diam.; *b*, portion of calice, showing one system of septa, magnified.
3. *Platytrochus compressus*—*a*, corallum, magnified 2 diam.; *b*, calice, magnified 4 diam.
4. *Trematotrochus Verconis*—*a*, corallum, magnified 3 diam.; *b*, calice, magnified 6 diam.

Plate II.

1. *Deltocyathus Vincentinus*—*a*, corallum, magnified 4 diam.; *b*, calice, magnified 4 diam.; *c*, base, magnified 4 diam.
2. *Homophyllia australis*—calice, magnified 1·5 diam.
3. *Plesiastræa proximans*—*a*, corallum, magnified 2 diam.; *b*, a calice, magnified.
4. *Holcotrochus crenulatus*—*a*, corallum, magnified 5 diam.; *b*, end view of corallum, magnified 5 diam.; *c*, calice, magnified 10 diam.

ANTHROPOLOGICAL NOTES MADE ON THE SOUTH AUSTRALIAN GOVERNMENT NORTH-WEST PROSPECTING EXPEDITION, 1903.

By Herbert Basedow.

[Read June 7, 1904.]

Plates III. to XXI.

The mineralogical duties in connection with my position of Prospector to the Government North-West Expedition did not permit of my making extensive anthropological observations, but the following facts are placed on record to afford some account of the natives of a region of Central Australia that has been practically unexplored, from an ethnological point of view, and to bring these tribes into comparison with those natives of Central and Northern Australia which the reports of the Elder and Horn Expeditions and the work of Messrs. Spencer and Gillen have made comparatively well known. I have divided the paper into two parts, the one being a general description, the other dealing with the question of native art. During our journey I collected a vocabulary of about 1,500 words of the Aluridja and Arunnda (Arunta) languages; but as this paper has exceeded its expected limits I am obliged to defer for the present the publication of that section of my notes. I have, however, included as an appendix a short vocabulary of the Karkurrerra Tribe inhabiting the Musgrave Ranges.

PART I.—GENERAL DESCRIPTION.

Tribes and their Distribution.—The natives that inhabit the north-western corner of the State of South Australia proper and the south-western portion of the Northern Territory, that is, broadly speaking, the inhabitants of the ranges of these regions, are divided into four great divisions or tribes, differing but little, or not at all, in their chief characteristics. The names of these four tribes with their geographical distributions are as follows:—*

i. The Karkurrerra Tribe.—These natives inhabit the greater portion of the Musgrave Ranges, more particularly the southern limits.

ii. The Alinjerra Tribe occupies the territory east of the Musgrave Ranges, extending both north and south.

iii. The Wilrurrerra (Wilruddidda) Tribe inhabits the country west of the Musgrave Ranges, extending north to the Petermann Ranges.

iv. The Ullparidja Tribe.—The Tomkinson and western Mann Ranges form the domain of this people.

* These are the names of the recognised divisions or tribes in the broadest sense, much as one would call them Northern, Southern, etc.

Definite boundaries, determined by natural features of the district, exist between the regions occupied by the various tribes, and the strictest care is maintained not to intrude upon the neighboring territory. It appears, however, that certain tribes are on friendly terms and communicate with one another by casual visitations. This fact was noticed at Opparinna Spring. A native of the Karkurrerra Tribe, who had temporarily been employed as a guide to water by the Expedition, returned to camp in the company of natives of the Wilrurrerra Tribe, and they all appeared to be friendly to one another. Yet tribal feuds seem occasionally to occur. The same native (Immalangenna) accompanied our Expedition to the eastern extremity of the Musgrave Ranges, and it was the intention to take him further south to assist in the location of native waters. To this request he seemed indisposed; for upon leaving the ranges but for a short distance he became very uneasy and soon abandoned the party to hurriedly return to the ranges. He, however, gave a very graphic account of a strife which took place between natives south of the ranges, and which, on being interpreted, was somewhat as follows:—It happened during our absence north of the ranges, that members of the Wilrurrerra Tribe descended to the low-lying country south of the Musgrave Ranges, which, in his own language, are called "Uttnöbella," and, seizing upon several members of the Alinjerra Tribe, who were on a "walk-about," murdered them. The news was quickly carried to the main camp of the attacked natives, who immediately set about to revenge their fallen mates. A party of armed men * departed in the direction of the locality that the aggressors were last seen in. Tracking was difficult, as the aggressive natives are reported to have obliterated their tracks. Nevertheless, at sundown of a certain day, a slight column of smoke, which undoubtedly was that of the enemy's camp fire, was observed rising from a "mulga" † thicket in the distance. Halt was made until the enemy were considered to be fast asleep, and then their camp was cautiously approached to within a short distance. No attack was made until the first glimpse of dawn, when the enemy were suddenly rushed upon in their sleep and every male murdered. The females that were sleeping at the sides of the men were not hurt, but allowed to return to their territory.

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* The tracks of this party were still preserved in the sand on our return to the south of the ranges, and were recognised by our natives as those of: Jinnangalerriknga (Big-foot), the leader of the party, Jinnakularrikna (Stink-foot), Kartakardonne (Bald-head), Kinnegunne, Jinnamureryanna (Crooked-foot), and Muranni.

† The name "mulga," which no doubt belongs to the vocabulary of some Central Australian native tribe, has now been generally adopted by the whites for a common species of *Acacia* (*A. aneura*).

Subdivisions.—The main tribes are again subdivided into groups, that name themselves after a prominent natural feature that happens to exist within their hunting grounds, such as a waterhole.* For instance, members of the Karkurrerra Tribe were met with in the south of the Musgrave Ranges who call themselves the Odidjuloo, which is at the same time the native name of a large waterhole in the vicinity, though they still recognise that they belong to the Karkurrerra Tribe as a whole.

Hunting and Native Foods.†—As is well known, hunting is the principal occupation of the Australian native's life. The larger game is supplied by kangaroo *(Macropus rufus)*, "marloo," euro *(Macropus robustus)*, "kanalla," wallaby *(Petrogale lateralis)*, "waru," and emu *(Dromaeus novae-hollandiae)*, "kaleya." These, besides being approached by stealth and speared, are hunted in various other ways. A common method is to spear the game as it comes in to drink at a waterhole. At Ulurinna, a native water in the Ayers Ranges, which is situated in a gorge and only accessible from one direction, a fence of brushwood had been built round the waterhole at the further side from the entrance to the gorge, behind which the native, lying in ambush, awaits the arrival of game, driven thither by thirst, and spears it there without further difficulty.

Long fences are also constructed in the mulga scrub by merely piling together branches of this and other bush one over the other. These zigzag brush fences, which may be at times almost a mile in length, assume various shapes in plan, but usually converge to one or more points like the arms of the letter V. The idea is to drive the game into the enclosure, when the arms of the converging fences ultimately lead it to the angle point. A small opening is left at this spot, and a man, hiding close by, spears the game as it emerges.

Having attained the spoil, the natives often express their satisfaction in a remarkable manner. In the Tomkinson Ranges, members of the Ullparidja Tribe were observed to dance about a man, who had killed a kangaroo, and all the while to hold their sub-incised urethras to view, each upturning his penis and widening the slit to its utmost extent.

A remarkable little incident was noted north of the Musgrave Ranges, where a member of the Karkurrerra repeatedly picked up the dung of kangaroo, broke it in two, and smelt it, often uttering the word "kuiya" (no good). The significance of this act I could not definitely ascertain, unless it represented a means of determining the age of the animal excrement, and so to get a

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* *c.f.* "Occasionally they attach the name of some important geographical feature. . . ."—E. C. Stirling: Anthrop., Horn Exped., page 10.

† For the description of Native Water Supplies in Central Australia, see my Geological Report.

clue to the time of the last visitation of the locality by the kangaroo.

Opossums (*Trichosurus vulpecula*), "waiyoda," are found inhabiting the large eucalypts that line the watercourses in many parts of Central Australia. They are hunted by climbing the trunks of the gums and seizing the opossum in, or driving it from, the hollow in which it is concealed. This is often a feat of great skill when the tall, smooth trunks of the gums are taken into account. The usual way of accomplishing it is to cut successively a series of small holes in the bark with the embedded flint ("kunndi") of the spear-thrower, one above the other, and thus gradually ascending to the first limb of the tree by virtually clinging to the bark with their toe and finger nails.

Another method adopted by them is to light a big fire at the base of the tree and wait until the tree collapses by being burnt through. The opossum, if it does not leave its shelter to be speared, is easily captured in the hollows of the tree and killed.

The slow-moving native hedgehog (*Echidna aculeata*) or "tchele" falls an easy prey to the hunter.

Dingos (*Canis dingo*), "papa," are keenly hunted and eaten; they are usually speared at a waterhole. The dingo is also tamed and "domesticated" when taken young. (See Plate IX, fig. 1.) They are, however, of no use for hunting, but are greatly fondled and fed up by the natives. Even the semi-civilized blacks retain this weakness. At Stuart's Creek a wurley (native shelter) that was inhabited by three females came under observation. Sleeping with them, and under the same blankets, were no fewer than fourteen dogs.

Rabbits, which are now plentiful in the southern Musgrave and Ayers Ranges, are a welcome and easily attained source of meat supply. The comparative scarcity of this animal in the Tomkinson and Mann Ranges is a proof of the keenness with which it is hunted there by the natives. They are either speared or killed by hurling sticks* and stones after them when in flight, or are unearthed from their burrows. Extensive diggings for rabbits were encountered throughout the trip, and whenever natives were accompanying the caravan they would never hesitate to examine the burrows for fresh tracks.

Snakes and lizards of all descriptions form daily meals. They are mostly captured by hand. Seizing the snake or lizard by the tail, the native rapidly whirls it above his head, and thereupon dashes its skull upon a stone or log. In one case, I observed a gin (native female), who had caught a large lizard, and was not prepared for the meal, to tie the lizard by one of its legs to a bush, and thus keep it alive until she was ready to cook it. They

* A small kind of specially prepared stick known generally among the whites as a waddy was found to be in use in the Tomkinson Ranges.

are often driven from beneath bushes and "porcupine-grass" (*Triodia*) by setting fire to the same and catching the prey as it endeavours to escape the flame.

All kinds of birds, even the smallest, are constantly sought after to be used as food; particularly do owls and hawks, that inhabit the hollows of gum-trees, fall an easy victim to the ever-hungry native.

When the season is favourable, grubs ("ilguare" and "iljaleti") and caterpillars ("udnamarre") are extensively collected and devoured. The "ilguare" lives on the roots of species of *Acacia* and *Cassia*, and it is interesting to watch a native hunting for these. A long rod with a chisel edge at one end, and often referred to as yamstick ("wannă") is forced into the ground at the side of the main stem of the bush and leverage applied. If the root has been attacked by grubs it will readily give way to the strain, and the native consequently sets to work with his "wannă" and hands to unearth the grub. Less difficulty is experienced in finding the "iljaleti" (larvæ of *Cossus sp.*) which lives in the trunks of eucalypts.

At the time of our arrival in the ranges the ground was covered with large green caterpillars that were collected by the natives in large wooden vessels ("mika") carried upon the heads of the women.

A "native sweet" which is eagerly sought both by young and old is the honey-ant (*Melophorus inflatus*) or "winudtharră" of the blacks.* (Plate IV., fig. 1.) These curious creatures, nocturnal in habit, live associatedly in colonies below the surface of the ground, usually in thickets of mulga and at the base of one of these trees. The native, on finding the exit from the ants' nest, traces the narrow channel downwards by working with his hand and stick to a depth of often many feet, at which the colony resides. The "honey-ant," which it has been ascertained is one of the workers specially modified, stores honey within itself at the expense of the gatherings of the remaining ants, to an amount disproportionately large when compared with its own size. To permit of this the abdominal portion of the ant swells, according to the intake of honey, until it assumes a globular form having a diameter of a centimetre or more. This globule of honey is enclosed by the integument stretched to a thin membranous skin, along the median line of which the separated, black, thoracic plates are visible. The viscera are compressed into a small space near the vent. The ant is in this condition practically helpless as far as locomotion is concerned. This phenomenal accumulation of honey appears to be a natural mode of storage for times of

* Compare Baldwin-Spencer. Horn Exped. Cent. Aust. "Narrative," pp. 87-89.

need. The natives are passionately fond of these little luxuries of the bush and spend hours collecting the same. To eat the honey, the ant is grasped by the head, the abdominal portion placed between the lips, and the contents squeezed into the mouth and swallowed. To the palate the first sensation is that of a distinct taste of formic acid, which no doubt is excreted by the ant as a natural protection. This taste is, however, slight and momentary, and upon bursting the membrane a recognition of the taste of rich honey follows.

Eggs of birds, large or small, and of some lizards, whether they be fresh or partly developed, are gathered wherever opportunity is afforded. Emu eggs are relished; these are cooked as follows: A hole is made in the sand big enough to receive the required number, which, after being pierced at the end, are placed aperture upwards in the hole, the intervening spaces being filled up with hot ashes and sand.

Landsnails, "pira," live in the vicinity of the north-western ranges, and, after a shower of rain, very many can be collected in a short time by the black residents, who roast and eat them. Consequently, accumulations of empty shells of these molluscs are frequently found, thickly strewn about the fire places of deserted camps. The most common snail thus treated is the large *Helix perinflata.*

Cooking.—As regards the cooking of the various articles of diet mentioned above: Game, such as kangaroo, is cooked whole. The skin is not detached, and the bony paws may, or may not, be removed beforehand in order to secure the sinews for future use.* The carcase is laid upon its back, completely covered with hot ashes and sand, and thus permitted to cook.† When sufficiently, which often means only partly, cooked the skin can easily be removed and the meat appears tender and juicy. The belly is cut open, and by groping about with the hand the intestines are removed; this, after its contents have been squeezed out with the aid of two fingers, is distributed among the less privileged members of the tribe. The body is next torn to pieces with their hands and the parts distributed to all members having a right to such (the biggest piece usually remaining for the man who divides the meat). Most of the bones, if not crushed between the jaws, are shattered by means of the grinding-stone ("miri") and the marrow eaten.

Grubs and caterpillars are merely thrown upon hot ashes to roast; the latter, however, are permitted to remain there a very short time only, and are eaten almost raw; in doing so the green juice can be seen running down either side of the native's mouth.

* When cooking the bigger game I noticed that the bones of the hind legs (deprived of the paws) are made to project slightly above the sand.

† Compare Baldwin Spencer, *op. cit.*, page 94.

Vegetable diet is not neglected. One of the common meals is constituted by the small tunicated corms of *Cyperus rotundus*, that grows in the sands skirting the beds of watercourses, and known to the natives as "dunnmördta" The corms are unearthed, usually by the gins, mixed with hot ashes and roasted, then taken, about half-a-dozen at a time, and rubbed between the palms of the hands. This process detaches the brown coverings of the bulb, which are then blown away, leaving behind on the hands the nut like "dunnmördta" to be eaten.

The spore-cases of *Marsilea quadri-folia*, usually known as "nardoo" by the whites, do not appear to be much used for food.

A native meal that was also enjoyed by all members of the Expedition consisted of the "native truffle," or "widida" of the blacks, which was found growing in the sandhills north of Opparinna Spring and elsewhere. This fungus does not generally rise above the surface of the sand, but just raises the soil sufficiently to indicate its position; it therefore only partially resembles the European truffle in this respect. The "widida" are eaten either raw or after being roasted in ashes. In many cases they were fly-blown; this being a proof of the rich, fatty nature of their substance.

Various species of *Solanum* produce fruits which, when ripe, are collected and eaten by the blacks. They call the fruit "winya-winya." A similar statement holds good for the gooseberry—like fruits of *Melothria* or "ilgodda" of the natives, the fruits of the native plum tree (*Santalum lanceolatum*) called "algullia" by the aborigines, and the red fruits and kernels of the native peach tree (*Santalum acuminatum*).

Seeds of acacia, portulaca, and certain eucalypti are ground to powder, usually with the addition of water to produce a paste, which is then baked.

The leaves of the succulent *Claytonia*, often called "parakylia" by the whites, and *Portulaca ballonnensis*, popularly known as "munyeroo," are frequently eaten, especially when water is not close at hand.

The dry fruits of the native fig tree (*Ficus platypoda*) are also eaten.

The slender stalks and leaves of a small plant that is usually found creeping up the stems of mulga when chewed have quite an agreeable, sweetish taste; they are for this reason continually being picked and chewed by the native folk, who call the plant "pauyu."

Galls upon mulga (*Acacia aneura*) and bloodwood (*Eucalyptus terminalis*) trees, and commonly known respectively as "jarrulge" and "errikollbolla," are eaten by the blacks. The former is found on various species of *acacia*, and varies in size from that of a pea to that of a walnut. The whole of the growth,

with the exception of a small kernel-like structure in the centre containing the insect, is edible. The taste, though slightly eucalyptine, might be compared with that of a "tasteless apple." The bloodwood "gall apple" is a nodular, woody, and warty growth, the inside of which is hollow, and contains, besides the parasite, a sweetish juice. The inner layer of the coat of this "apple" is white, soft, and edible.

The flowers of many plants are at times gathered, and the honey sucked from their calyces. Women and children were observed to do this.

The seeds of the kurrajong (*Brachychiton Gregorii*) are roasted and eaten, while the young roots are chewed in case of need.

The native always eats the whole, or at least as much as he possibly can, of the proceeds of one day's hunting—never having a moment's thought about to-morrow's *menu*.

The properties of the dry leaves of pituri* (*Duboisia Hopwoodi*), the so-called native stimulant, which is known to the natives of this region as "peturr," have already been discussed by various writers. In this case, also, it is chewed or sucked in the form of rolled plugs. These plugs, when not in use, are stored behind the ears of the owners thereof, and are often passed from one to the other and successively sucked. The males only were observed to partake of this stimulant.

Physical Features.—The stature of the natives of the tribes considered is, generally speaking, small; fairly well developed from head to hips, the legs being less so. At the time of our sojourn in the ranges the condition of the blacks was excellent, this being the result of the extraordinarily good season. The average stature varies considerably. The tallest men were found among the Ullparidja, in the Tomkinson and west of the Mann Ranges, two members of this tribe having been noted to be over 6 ft. high†; others being not much short of that height. Yet, at the same time, dwarfs—adult men—under 5 ft. high appear among the same people. The females vary less in height among themselves, averaging about 5 ft. 4 in. The tallest female was met with south-east of the Musgrave Ranges, a member of the Karkurrerra Tribe bearing the native name of Ptumpalenna, who stood close on 5 ft. 9 in. in height.

The facial features are of the typical Australoid type that has often been described, though the repeated encounter with men

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* See also Rep. Horn Exped., Anthrop., p. 61; A. J. Higgin: Proc. Roy. Soc. S.A., 1903, page 202; and Rep. Elder Exped., Anthrop., page 293.

† Lindsay, Palmer, and Stirling have noted exceptionally tall natives from other parts of Central Australia. See Anthrop., Horn Exped., p. 16.

having the so-called "Jewish type" of nose is worthy of note.*

The development of hair is, for the most part, good, the majority of the men wearing long black beards. The males wear the hair of the head long, either loose or tied up into a "bob" or chignon with hair string. This is padded with emu feathers, and is utilised to carry in its centre various small articles of use, such as flint chips, kangaroo sinew, and the like. The hair of the old gins is usually thin on the top of the head, no doubt as the result of the wear produced by constantly carrying the food or water vessels upon the head. Quite a systematic mode of "doing up" the hair was observed among the young gins of the Musgrave and Mann Ranges. All the hair is gathered on top of the head and tied into a small "bob" above the forehead. A fringe is left, which is ornamented with a number of seeds of the blood-wood (a species of *Eucalyptus*): these are attached by forcing a number of hairs into the aperture of the seed and sealing them down with a small splint and ant honey (Plate III., fig. 5). Quite a series of these seeds dangle side by side from the fringe in front of the forehead, and constitute the "dindula." In some instances the old men were noticed to have developed a very thick growth of short black hairs down the back. The light coloration of the hair of several children of the Ullparidjas was a marked feature.

These natives are of extreme uncleanliness, and they literally stink with accumulated filth, for their bodies have never been washed since the day of their birth. It must, however, be admitted that great and prolonged scarcity of water is one of the normal conditions of their lives. Their hair teems with vermin. Hours are spent in a manner similar to that which I have seen in the case of Ceylon natives and apes in captivity—by one individual searching the other's head for this pest, and deliberately placing the captives into his mouth. Most frequently is to be seen a mother thus searching her infant's head.

Personal Decoration.—Personal decoration does not receive much attention. Chest ornamentations that were observed were usually in the form of a regular arrangement of circles divided horizontally by straight bars, the whole design being drawn with the finger in pipe-clay or ashes (see Plate IV., fig. 5). Compare, further, the designs on Plate XII., fig. 3, and Plate XX., fig. 4.

* This has elsewhere been noted by various observers, as E. C. Stirling: Anthrop., Horn Exped., p. 15. Professor Spencer points out that this similarity is only superficial. The nose, which is sometimes spoken of as "Jewish" in type, is not really so. The hair gives also a patriarchal appearance.

The foreheads of the men are generally coated with charcoal and grease; the bodies of young and old, moreover, receive a covering of fat and ochre, the application of which no doubt tends to keep the skin supple when subjected to the scorching rays of the sun and wind.

The "döllgu wipu" (Plate III., fig. 1) is worn through the hair at the back of the head by the men of the Wilrurrerra Tribe, and consists of a small pointed stick of mulga, round the one end of which the tail skin of a rabbit-bandicoot (*Peragale lagotis*) is wound in a spiral manner and fastened by means of kangaroo sinew to the stick.

Both Gosse * and Carruthers † have reported the use of bone hairpins by the natives of these ranges. They did not come under my observation.

Necklaces ("olindu"), constructed of a number of parallel strands of twisted fur and tied together at the ends with short pieces of twisted human hairstrings, are generally worn. The separate strands are thickly coated with a paste of emu fat and ochre (Plate III., fig. 2). The females, more particularly the younger, in addition wear the "puttarra," a longer necklace, which, after being wound once round the neck, further passes underneath the left shoulder of the girl. (See Plate VII., fig. 1).

The "wilkarru," consisting of a series of parallel strings of fur tied round the forehead, frequently adorns the men. It is usually constructed of opossum or rabbit fur. Strands of twisted (human) hair are further wound tightly round the stomach and upper arm by the men, the former being employed when out hunting to carry various weapons and game, the latter more usually for a corroboree decoration. The women usually have to supply the men with the hair requisite for the making of these strands.

The men commonly, though not invariably or constantly, wear as an appendage, fastened at its knot to the pubic hairs and partly covering the penis, the flat tassel-shaped "moiranje," constructed of human hair or rarely of rabbit fur ‡ (Plate III., fig. 3).

Personal Mutilation. — Personal mutilation is universal. Horizontal scars upon the chest and oblique scars dipping towards the centre upon the shoulder blades are general, the latter being usually restricted to the females ("tchipare"). The same is true of the cross scars upon the upper arm ("ngarlarrekin").

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* Rep. and Diary of Mr. W. C. Gosse's Cent and West. Expl. Exped., 1873; Parl. Paper No. 48, House Assemb., 1874.

† Report to Surveyor-General, Adelaide, 1892.

‡ See also, Stirling: Anthrop., Horn Exped., vol. iv., page 108; Spencer and Gillen: The Native Tribes of Central Australia, page 572; and Helms: Anthrop. Elder Exped., Trans. Roy. Soc., S.A., vol. xvi., page 246.

The nasal-septum is pierced in the case of either sex. This operation in certain cases takes place at the age of about 18 or 19 years. After the puncture, a rod of mulga, sometimes referred to as a "nose-stick," and in this region known as "delonngu," is inserted and shifted from time to time to prevent the hole from closing, and on special occasions the rod is replaced by a bone. The "nose stick" is not worn daily, but very often a native may be observed to pick a small green twig from a bush and wear it in the place of the former.

The custom of knocking out either one or two incisors was noticed to be generally practised. The most common tooth that was removed appeared to be the right upper lateral incisor; some times the corresponding tooth on the left side, and at times both teeth had been removed.

When a boy attains the age of about 16 years the operation of circumcision ("delldinge") is performed upon him. About this ceremony as practised by these tribes I was able to gather a little information from the natives, which, if their account may be relied upon, is as follows:—The boy is for some time prior to the operation kept apart from the main camp and tended by an old man. On the evening of the event, which no women or children are allowed to witness, he is brought to the side of the fires that have been kindled on the selected ground, when an old native, usually the father of the gin who is to be the future property of the boy, rushes upon the scene. This man, making hideous grimaces, with his beard upturned and held between his white teeth,* and rolling his eyes in a fierce-looking manner, advances towards the lad, holding in his face the sacred "wanningi,"† which up till that time the boy has not been allowed to see. The sight of the "wanningi" may therefore be considered an introduction to manhood. The boy, having been thrown upon his back, is held down to the ground by other men of the tribe, who securely clasp him by legs, arms, and head while the act of circumcision is performed upon him by the fierce-looking man with a sharp flint splinter. When the prepuce has been detached the operator holds it between his fingers in front of the blaze for a short time, then (according to the description given by the natives) quickly swallows it.‡ The ceremony is accompanied by monotonous songs, the words of which were supplied me by a native of the Karkurrerra Tribe:—

* Compare E. C. Stirling: *op. cit.*, p. 172, "The beards being pushed between the teeth."

† This "wanningi" appears to be precisely the equivalent of the waninga described on pages 230 and 231 of Spencer and Gillen's "The Native Tribes of Central Australia." For a description of this ceremonial object, see page 28., and Plate III., fig. 4.

‡ See also E. C. Stirling: *op. cit.*, page 172.

Gunditi mangaroo mangoralle
Illa kuta dīlkunndalle
Gunngudda gudanne innandāällē
Tchunatche pērē amanme amanni
Kurerre ami imanne kaditi imanni
Kalingu wiginnti wigiliunburne alunma giraitchere
Munda giraitcherī manda ngunnzi wanapale
Alunma allaitcheritcherī jadunn burari madunn burbari
Aiyumba umbi madata dadi.

The operation of sub-incision ("kallokundana") takes place subsequent to that of circumcision. The urethra is slit downwards from the glans with a sharp splinter of flint. Hot ashes are thrown over the wound, which is later treated with emu grease. I was unable to elicit any reason for this mutilation. On questioning through an interpreter, the general reply was that the population is thereby not checked; it is merely a custom handed down by their ancestors, and about which even the native himself knows little or nothing.

Healing of the Sick.—The custom of bleeding from a vein of the forearm* at the bend of the elbow, known as "marrepa," was noted at least for the Karkurrerra Tribe. It seems to be mainly adopted in cases of sickness. The blood, which is collected in a water vessel ("mika"), being both smeared over the painful part of the sick man's body and given him to drink. As a result of the operation many natives bear small scars at the site of puncture of the forearm.

As regards other methods of healing the sick, considerable faith is attached to the magic influence supposed to be exerted over the affected part of the body by various inert objects when in the hands of the so-called medicine man or "nangarri." In this connection the "darreke" receives most attention. This instrument or rod is made from the bone of the leg or arm of a dead man. Touching the sick man with the "darreke," the "nangarri" imitates the dull, half-guttural call of the emu,† and the sufferer considers himself convalescent.

In a somewhat similar way the obsidian bombs,‡ which are known as "pandölle" or "kaleya-korru" (emu-eye), are employed.

For internal complaints of the stomach a process of fumigation is resorted to. The invalid is made to rest over a smouldering fire by supporting himself on elbows and knees, in order to

* See also Spencer and Gillen: The Native Tribes of Central Australia, page 464; and Stirling: Anthrop. Horn Exped., page 181.

† Spencer and Gillen, *op. cit.*, report the "medicine man to assume the form of an eagle hawk."

‡ In Tison and Howitt's "Kamilaroi and Kurnai" rounded (generally black) pebbles are mentioned, which are supposed to be of general magic power.—Page 251. Very likely these pebbles are obsidian bombs.

permit the warmth and smoke of the fire to impinge freely upon his bare belly for a considerable time.

For wounds of all descriptions a universal remedy is emu fat and ochre, which really appears to be a most effective application. Broken limbs they cannot "set." On several occasions natives were met with who had previously broken a leg. The bone had grown together again in a distorted and awkward position. The natives referred to limped very badly, and used a stick to assist them in walking.

Diseases.—The natives, without exception, were healthy, and happily free from those contagious diseases which have become so general among the blacks nearer to civilization. What was at first mistaken for a widely distributed skin disease proved to be nothing more than scabs and slight wounds, produced by carrying the firestick too close to the body while in motion; the hot air and burning particles blowing against the body cause slight burns on the skin, which are subsequently made worse by irritation through scratching.*

What is rather an annoyance to the natives are the various kinds of prickles and seeds of grasses entering the soles of their feet and breaking off at the base. The embedded point produces inflammation and suppuration around it, and causes pain. Many an hour is spent at the camp-fire in removing such prickles from the feet, the native every now and then emitting a subdued "irr," partly expressing pain, and partly disgust or temper. The method adopted by the natives of walking one behind the other where possible is partly on this account, namely, to minimise the risk of picking up prickles with their feet.

An unusual case came under notice north of the Mann Ranges. A boy, about seven years of age, had a very large scar covering about half the area of the upper skull, over which the growth of hair appeared to have been permanently destroyed The scar was not unlike that produced by a burn.

Weapons, Implements, etc.—In the making and use of implements and weapons the tribes encountered during the expedition were particularly primitive, more so, apparently, than in any other part of Australia. A fair amount of hunting is done with the simple aid of stones and sticks, which are used to hurl at the smaller game. Boomerangs, waddies, shields,† and other important weapons recorded for different tribes are not known, as far as

* Compare Helms: Rep. Elder Exped. Trans. Roy. Soc., S.A., vol. xvi., page 242.

† H. Y. L. Brown reports that shields are employed in the Musgrave Ranges: Rep. Trip Warrina to Musgrave Ranges. Adelaide: by Authority: 1889; and W. R. Murray writes: "I have seen no shields or stone axes here."—Extracts from Journs. of Explorations by R. T. Maurice. Adelaide: by Authority: 1904, page 19.

observation went, to any of the tribes that inhabit the north-western ranges.

The chief weapon used for hunting and fighting is the spear ("oiritchanna"). In this weapon, which is about 8 ft. long, the shaft is made from the wood of *Tecoma australis*, the blade at the top and the barb being of mulga. It is composed of three segments, the lower ("daparra"), central ("oiritchanna"), and upper (the blade or "talta"), connected by binding together with kangaroo sinew. The native names of the respective parts are given in the annexed figure. (See Plate IV., fig. 2.)

The spear may or may not have the barb or "nunngu." Another form of spear, made of a single piece of *Acacia*, with a flattened blade at one end and without a barb, is used more for killing animals in bushes, etc, than for hurling with the spear-thrower ("mero").* The process of straightening the rods used by the natives in the making of spears is ingenious. The curved portion of the rod, after being well greased, is placed over a stone and completely covered with a mixture of hot sand and ashes. Having frequently turned the rod, the native, after a short interval of time, seizes it with both hands, one on either side of the ashes, and by holding it such that the convex side rests upon the stone exerts a downward pressure from above at each end of the bend. Repeating the operation several times, and skilfully turning the rod about in the ashes, he ultimately straightens the rod perfectly. The process may be compared with the steaming of timber.

The spear-thrower ("mero") is wide and concave; none of the flat and narrow forms of many parts of Central Australia were found. It has a flint-chip embedded in porcupine grass gum ("kedi") at the handle, and very often a small rim of similar material around the handle, a short distance away from its end. In using the implement, therefore, the hand of the thrower clasps the handle between the two specified portions of gum. The names of its parts are given on Plate IV., fig. 3.

Two kinds of wooden food or water vessels or cradle-shaped carriers, frequently called coolemans by the whites, are in use, large ("mika") and small ("dokollko"), the former for receiving various articles as game, roots, and other gatherings of the day, the latter more for scooping water. Water is sometimes carried in the "mika" for long distances; in this case grass and leaves are put into it to prevent the over-splash and consequent loss. They are always carried by the gins, who balance them upon their heads while walking and hunting. They were found to be

* This form of spear is, for instance, used in the hunting of the rabbi cited by Murray,—*Op. cit.*, *page 19*—as it "can be approached within a spear's length when crouching in a bush, and is easily impaled without necessity of throwing the spear. . . ."

invariably made of soft wood, usually from the bark of eucalypts.

The so-called yam sticks ("wannă"), which are used in general both by male and female (more usually the latter) to unearth roots, lizards, grubs, etc., are made very large in size. Some specimens were 6 ft. or more in length.

A useful implement was found among the belongings of the Karkurrerra Tribe. It consisted of an ordinary rod of mulga, to one end of which was attached, by binding with kangaroo-sinew, a small spade or chisel-shaped piece of iron roughly ground into shape (Plate III., fig. 6). The iron had been sharpened along the cutting edge, and had been made narrower at the opposite end—such that it could be more easily bound to the rod of mulga. The iron had no doubt been obtained from the hoops of an abandoned water keg, or suchlike, of a former expedition. This implement was useful both for digging and for sharpening spears, etc.

The native hand mill consists of a grinding-stone, "miri," usually a water-worn pebble three or four inches in diameter, worked by hand upon a flat slab of rock, "tchewa." (See Plate IV., fig. 4.) The motion is not circular, but backward and forward. Not only is the hand stone used to grind up various seeds of acacia, eucalyptus, portulaca, and other plants, but also to crush the bones of cooked meat to secure the marrow. The hand stone is usually carried about by the gins in their "mikas"; the lower slab is, however, not generally transported, on account of its weight, a suitable slab or the level surface of a rock *in situ* in the proximity of the ranges being not difficult to find.

Stone knives ("gadorg" or "nyilla") used for the various acts of mutilation that are practised require no detailed description. They are merely sharp chips of flinty rock (chalcedony), of very variable shape and size, derived from the "Desert Sandstone" formation. None of the well-made trigonal "knives" that have been recorded from the MacDonnell Ranges and elsewhere came under my observation. The small flint chip ("kunndi") embedded in the handle of the spear-thrower ("mero") has already been referred to; it is most frequently used in the scraping into form and pointing of spears, and the making of other implements.

Fire-making.—The implements and methods used for the making or kindling of fires are multifarious.

In the first and simplest case the use of the fire-stick is universal. This consists simply of a piece of bark or a dry stick glowing at one end. It is carried about in the winter wherever the natives go, each member carrying his own. Directly a halt is made, a fire is lit, in day-time to cook the game, at night to supply warmth during sleep When camp is left a fresh stick is taken from the fire. The stick is carried in the hand with a waving motion from side to side, in front of the native. When

moving about in the dark this motion is continual in order to keep alive sufficient flame to light the way. A large body of natives moving at night in the usual Indian file, and each carrying the burning stick in the way described, forms a striking sight.* The firestick will naturally not be so constant a companion during the summer months.

The actual process of fire-making, depending upon the principle of heat development by friction upon the abrasion of two pieces of wood, is employed in various ways.

In one case a perfectly dry rod of mulga is cleft at one end, the split enlarged on one side and packed with dry blades of grass. The implement thus constructed is called "pinjilere." A spear-thrower ("mero") is placed with its edge over the fissure directly above the dry grass and at right angles to the length of the rod, and rapidly rubbed backwards and forwards. Ultimately the friction causes the wood to char at its edge; particles are detached by the abrasion, it begins to smoke by slight combustion, and eventually a tiny detached spark falls upon the dry blades of grass At this moment the native ceases to work the "mero," and forces the spark into a flame by gentle blowing. When the spark has "taken," the contents of the cleft are emptied on to a small heap of dry grass and leaves upon the ground, and by continual blowing a rapidly growing flame is produced.

Dry roots of trees (mulga) are similarly used A root, about eighteen inches long, has one end rounded off; this is placed in a small hole in a second piece which is kept firmly resting against the ground by the native who sits beside it. This he achieves by placing the side of one foot over one end of the root, and the knee of the opposite leg upon the other end. At the same time he rapidly twirls the loose root between the flat palms of his hands, the rounded end of this rod fitting or subsequently adapting itself to the depression or hole in the lower root. The wood-dust that accumulates by the abrasion eventually begins to smoulder, and finds its way along a small groove leading out from this hole; thence it falls upon a fragment of bark placed below the groove, and is kindled into a flame as described above. The hands of the native, by virtue of the downward pressure exerted upon the root, gradually find their way from top to bottom of the upright root. They are then rapidly replaced to the top and the half-backward and half-forward rotation restarted.

The Making of Strands of Fur, etc.—On several occasions twisted strands of fur that are variously employed by the natives have been mentioned. Opportunity was afforded to watch the

* Witnessed on the evening of May 22, at Mount Davies.

making of such strands by the natives at Opparinna.* The loose fur (which in this case was that of opossum) is spread out on a clear patch of sand and beaten for some time with small sticks, which have been prepared by breaking green twigs from a bush and holding them in hot ashes for a short time, thus enabling the bark to be readily removed with the flint of the mero (spear-thrower). This process of beating makes the fur soft and incoherent. Two small sticks previously used for beating are then converted into a cross-shaped spool by biting a hole through the centre of the shorter stick and pushing the end of the other through it to a distance equal to about one third its whole length. A small quantity of fur is next taken up with the left hand, a little of it drawn out with the thumb and finger, and with the flat of the right hand rolled along the thigh of the native, who is in a sitting position. At the same time the fingers of the left hand draw out more and more fur, the right hand continually rolling as it comes, until a fair length of coherent string has thus been produced. The native frequently spits on to his right hand and thigh to make the fur catch better. The small length of formed string, which is still in communication with the incoherent fur, is next wound crosswise across the intersection of the arms of the spool; then, holding the fur end of the string in the left hand, which keeps up the regular supply with thumb and finger, the right hand skilfully twirls the spool. This process serves to twist the string more efficiently than the preliminary rolling of the fur with the hand. The string by this means rapidly forms and lengthens, and is from time to time wound on to the spool for convenience of handling until the required length is made. To remove the strand the small arm of the spool is simply pushed upwards and off of the longer. The coil is placed round the wrist and is ready for further treatment or working up if required.

To make a necklace ("olindu") two strands of a length of string are twisted together, and this doubly-twisted strand folded several times upon itself, and each end being tied with a short string of twisted hair (usually human). These two short ligatures further serve to tie the necklace at the back of the neck. The separate strings of the "olindu" are further thickly coated with red ochre.

After the above description, the method of construction of the ceremonial object previously referred to as "wanningi" may be easily understood. Having secured a good length of string, a small cross-like frame is constructed, similar to the spool

* Compare the method described by Spencer and Gillen in "The Native Tribes of Central Australia," page 613; E. C. Stirling: Anthrop. Horn Exped., page 100; and W. E. Roth: "String and other Forms of Strand, etc.," North Queensland Ethnography, Bull I., by authority, 1901.

previously described (the arms of which vary from 6 in. to a foot in length). Starting from a centre at the point of intersection of the two arms of the cross, the string is wound successively from one arm to the other, passing once round the arm at each point of contact. This winding is continued until completed, as shown in Plate III., fig. 4, the end of the string being loosely tied by a simple knot to the nearest arm of the cross.

Manner of Life.—In general, the natives live exclusively in the open. No form of protection from above is resorted to, except when compelled by continued rainfall to construct primitive huts or native wet-weather shelters. (See Plate V., fig. 1.) These are constructed after one and the same principle, though on slightly different patterns. The usual plan of construction is to ram an uprooted dry trunk of mulga into the sand in an inverted position, so that the horizontally branching roots are at the top. Making this the central support, branches of mulga and bush are placed in a slanting position between the roots at the top, the extremities of these branches forming a more or less complete circle at the surface. An opening is left on the leeward side big enough to permit free access. The spaces and gaps between the branches are filled up with small bushes, grass, and *triodia* tussocks, and on top of all sand is thrown. The floor of the hut is scooped out, the sand being banked up along the walls to keep the water from flowing in, and a fire is kept burning inside. The height of such huts is about 5 or 6 ft., and the base 9 ft. in diameter.

Very often the branches are merely placed around a standing tree as a central support, and now and again the branches are simply made to rest against one another. Sometimes the shelter is made by piling branches and bush either upon the overhanging limbs of a tree or in such a manner as to connect two adjacent bushes.

Brushwood shelters ("youo"), which are employed every night, are constructed by throwing together a few branches of mulga or other foliage at the windward end of the native's camp, towards which end the sleeper always rests his head. In sleeping he makes a fire on either side of him, and scoops out a depression in the sand for his body to lie in. If several individuals sleep side by side, a fire is made between each pair of bodies as well as at either end of the row. This alternate position of fire and man is economical, as each fire serves to warm two natives, one on either side. The positions, moreover, occupied by the natives when sleeping collectively receive distinctive names according to whether they are central ("mbuppola-indoma"), that is, having another man lying on either side, or at either end ("ituppulindoma") of the row of sleepers. (See Plate IV., fig. 6).

The men who possess wives sleep with their families apart from the main body of men. When a native sleeps with his lubra only two fires are employed, one in front of either person, the backs of both lying in close contact along the centre. When a child is present it occupies a position in front of its mother, usually clasped within her arms. When the weather is extra cold additional fires are lit at the feet of each individual, who in this case curls himself up and places his hands between his thighs to keep them warm.

A remarkable fact is that in cold weather the native, if he has been given any article of clothing, cannot be induced to sleep with it on during the night, although he may be shivering with cold. During the day, however, when it is tolerably warm, he will be quite willing to keep on any article of white man's clothing.

The systematic plan of their camps has apparently impressed the minds of the natives themselves, as in several cases it was represented in their rock drawings. (See Plate XIV., fig. 7.)

The native, after he has consumed his evening's meal, does not take long to fall to sleep. Usually a few members assemble for a short time to talk, the conversation mostly referring to the day's experiences.

Another amusement at the camp fire is the imitation of various tracks in the sand: For instance, an emu track is made by impressing lengthwise thumb and pointer in the sand; then, changing the thumb to the other side without lifting the pointer, a second impression is made with the thumb in this position at about the same angle as the first. Often the pad of the emu foot is added by an impression of the thumb at the intersection of the three toes. A kangaroo track is simple, and made with either finger or toe. A dog track is made with the fingers alone, the thumb making the impression for the pad, and the tips of the fingers those of the toes; the imprints of the claws are added by means of a small stick. A blackfellows' track is made with the use of hand and fingers only. For the imprint of a left foot the right hand is employed, and *vice versâ*. The hand, being held in a half-closed manner, is pressed into the sand on its outer side; this will give the ball and heel of the foot. The toes are dabbed in with the finger tips. Snake tracks are produced by permitting the outside of the hand and lower arm to glide over the sand in a sinuous manner. Various other tracks are prepared with the hand and foot, and I was told that in certain parts a camel track is made out of the imprint left in the sand by the stern of a piccaninny.

A humming chant is often resorted to by several members of the camp, who beat time to their tune by striking two sticks together, until one by one the whole group of natives falls to sleep.

The sanitary conditions prevailing at such a camp, even when the camp is to be stationary for some time, are far from pleasant. The excrementa are deposited in direct proximity to the camp, within a foot or less of the sleeper.

During the hot summer months cave shelters in the neighborhood of permanent waters appear to be frequented and used as dwelling places. The very numerous drawings in such caves and the game traps around the waters bear out this statement.

Marriage Rites, etc.—The number of wives possessed by blacks varies. The greatest number that was observed (and that appeared unique) was three, one or two being the usual number. A fair impression as to the number of members comprising individual families may be gained from the following statistical data of families belonging to natives of the Musgrave Ranges:—*A*, two lubras and three piccaninnies; *B*, three lubras and one piccaninny; *C*, one lubra and one piccaninny; *D*, one lubra and three piccaninnies; *E*, two lubras and four piccaninnies.

The methods adopted by the women of carrying their children are various, and all are used with equal frequency. In the first case the child sits astride on its mother's hip, clinging to her arm or neck for a support (Plate X., fig. 1); the second method is that ordinarily known as riding "pickaback"; and in the third instance, remarkable in its way, the child is placed in a lying posture behind the lubra, the legs of the child being placed under the forearm of the lubra at one side and its head treated similarly at the opposite side, while very often the child seizes one of the breasts for a support. This method permits the mother free use of both hands (Plate VIII., fig. 2).

The lending of wives is a common custom.* It appears that the custom signifies an act of hospitality and friendly relation ship between the parties concerned. At Pundijarrinna, a native soakage well north of the Musgrave Ranges, a party of the Karkurrerra Tribe had camped not far from the main camp of the Expedition. Upon visiting their camp I was somewhat surprised to see the old man of the tribe coming towards me with a young gin, and giving me to understand that I might take her with me as my own. This act on the part of the native was merely to show the friendly feeling the tribe had towards the white men.

Moreover, a corroboree was instituted for our benefit by the same natives. Fires were lit at the corners of an oblong enclosing a clear space, and we were told to sit down. Three men, apparently the most respected, who had disappeared in the darkness, suddenly reappeared at the further fires, having ornamented their bodies with short, broad, white bands of ashes

* Compare Spencer and Gillen: The Native Tribes of Central Australia pages 74, 96, 97, and 98.

across their abdomens and one additional band on either thigh (one individual had three bands across his right thigh). By this time all the females were kneeling at the nearer set of fires, and began beating their hands in regular time. This they did by seizing the wrist of one arm with the hand of the other, and causing the palm of the grasped hand to strike over the region between the upper part of their thighs, which were pressed closely together.* This produces the dull but effective note which accompanies the monotonous singing of such ceremonies. The songs were introduced by the following verse :—

Immandale shēri shēri 'mandale,

the same words being continuously repeated time after time with the same monotonous tune. The men, on the other hand, had seated themselves in a row between the further two fires, with their legs drawn up and crossed in front of their bodies. With a stern countenance they moved their heads from side to side, keeping time in so doing with the song of the lubras, but uttered not a word. Suddenly and simultaneously they jumped up, and, smiting the left hand at regular intervals with a small bundle of grass and flowers held in their right, they began stamping slowly towards the females ; the beating of the latter, the clapping of the hands and the stamping of the men all being performed in time and accompanied by a slight grunt on the part of the men. In this manner they proceeded right up to the gins, and then with a vigorous final beat of the hands they turned short and quickly walked back to the further fires to start the stamping and beating towards the gins afresh. The same proceedings were repeated over and over again. Strict seriousness was maintained during the time that the men were stamping, but when they had reached the lubras and were retiring to the further fires yells and laughter accompanied their actions. Other songs which were later resorted to are :—

Elunmā allaitchērī shērī
Binndipeyndē ngannyēparlē binndipeyndē ngannyēparlē
Inbanā marrukurrilbā ānī
Pulleyinā ūrarillbillāwarē
Ngunnyiparlē awönnaparle 'wönnaparle
Wanāpare larrindi ngunderī wunndēril.

A boy, about sixteen years of age, who had not yet been initiated was kept isolated from the camp, while a younger boy, about eleven years old, was permitted to take part in the proceedings. After the lapse of some little time the white men were asked to join in the stamping with the blacks, and general satisfaction was shown upon fulfilling their wish. This no doubt

* Compare E. C. Stirling : Anthrop., Horn Exped., page 74.

is the manner of procedure when neighbouring tribes or groups of natives visit.

Further words or verses that are sung at various corroborees were supplied to me by an old native. They are as follows :—

Sung only by the old men :

Tchinganalēri kootetū ngātatu araunā panganyĕno
Tchinganalēri karāma allbūrnā allbinya allyērillyĕrinna.

By the young men :

Awangā anōrre ōtannamanni unndi oolarri ennō

All together :

Ngūrra ngannngē ngānengā
Ngātā awankā kārū rinpī rērrinje
Alanoo kūrū innā innā ngata tunna āwangannyĕ ngata
Ngurrā ngannngē innyā kombērā mbarē
Jengaal garinjan ngarrawurrūbāne dedinmān
Yĕrrĕpōmatch wanganyĕ arrau murra murra wanganye
Unnja oolanna indawa oolannā pomatchī wanga wanganye
Dōmmā langannī lōkē umbeyallĕ
Ngalēli warrĕ winbā yālunnā
Karkūrrĕrrā imburreka ālōnnē immanjētidē
Wālū kūrarrē ngingannyĕ Alinjērra arinna alböranna
Witidī inmānī ngarrāwurrepālandĕ manno
Pala akrīkā ākwitchū pārinnā winbinkch kwitchu parinna
Nunnba attūtunna yawūlgāranna Karkurrerraralle ullgarannā
Jillgārē alinjella ngaralinna jillgā arinjella larinna
Nbērētch jinbērenn ālillderekarī nbērē jinberenn nderrēkalē ēūlare unnbūlane
Kutchū ngarinnā wanganyĕ warangililljo wanganye yānō.

The meanings of the above verses I was unable to ascertain, although several words included therein are familiar—notably the names of the two tribes, Karkurrerra and Alinjerra.

Naming of Native Children.—Each child receives a name. In many cases this name ends in what appears to be a diminutive ending, viz., "-inna." When the child grows up this ending is often dropped. For instance, a young girl of the Karkurrerra Tribe was called Unnrubinna; an old woman of the same tribe, Unnruba. Many natives have received names that allude either to deformities of the body or personal characteristics.* Examples of this class of names have been cited on page 13 :—Jinnakularrikna (Stink - foot), Kartakardonne (Bald - head), Jinnamureryanna (Crooked-foot), and Jinnangalerriknga (Big-foot).

* *c.f.* Stirling : *op. cit.*, p. 167.

Naming of Natural Objects.—Many native words have had a direct origin in their formation. They are imitative of the calls of birds, express characteristic actions, or imply similarity to other familiar objects. The bell-bird (*Oreoica petroica*) is called "ban-ban-balelle," the value and distribution of the separate syllables of this word corresponding to the never-ceasing call of that bird. So also the mopork* (*Ninox boobook*) is called "kore-gore," which name is in allusion to the sound of the nightly call of the bird. A blue hawk goes by the name of "kaleya gadabongu," signifying "emu-egg-breaker," from the fact that this bird is known to steal and eat emu eggs. *Sarcostemma australe*, to which white man has given the name of "milk bush," on account of its milky sap, the natives call "epi-epi"—"epi" ordinarily meaning a female's breast.

Naming of Heavenly Bodies.—Further may be noted the formation of names for the heavenly bodies by comparing them with earthly objects. The Southern Cross is compared with the claw of an eaglehawk (*Aquila audax*), receiving the name "Warridajinna." The Coalsack, situated close to the Cross, is compared with a resting emu, and consequently the name "Kaleyapubanye" has resulted. The Milky Way is talked of as a watercourse or creek-bed, viz., "Karu."

Silent Correspondence.—The strict silence that has to be observed while stalking game has given rise to silent correspondence by means of signs and gestures.† Thus a native, having come upon a fresh track of a kangaroo, wishes to convey the fact to his companion, some little distance off, without producing, at the same time, any cause to attract the attention of the game. This he achieves by imitating the leaping of the kangaroo with his hand—at the same time representing the direction of the track and the distance which separates the individual imprints in the sand. This, in other words, informs the second native whether the kangaroo was in full flight or leisurely hopping along. Similarly the winding track left in the sand by a snake is indicated by a zigzag motion of the hand in a direction corresponding with the course of the track. A peculiar method adopted to indicate upon asking the direction in which a certain thing or natural feature is situated is to turn the head facing in the particular direction, protruding the lips in an ugly, snout-like manner and using either of the words "würnma" or "illa," according to whether the object is far away or close at hand.

* The bird that gives the familiar "mo-poke" call is now generally recognised to be the boobook-owl (*Ninox boobook*), although up till recently it was supposed to be the tawny shouldered frog-mouth (*Podargus*).—See Campbell: "Nests and Eggs of Austr. Birds": 1900.

† See E. C. Stirling: Gesture or Sign Language, Anthrop., Horn Exped., p. 111.

The mode of beckoning, too, is peculiar. Instead of the upward and inward motion of the hand, as practised by the white man, the native does the reverse—the hand is moved downward and inward.

Burial of the Dead.—The dead are interred* with great mourning ceremony. A native grave was seen in the Musgrave Ranges in which a woman had quite recently been buried. Close to the grave existed the place of wailing, where the mourners had made martyrs of themselves by inflicting wounds upon their bodies and had upturned the earth with their hands during their song of woe. All the signs of the performances were still preserved. The grave, in which the corpse had been buried a few feet below the surface, had been filled up with earth and a circular mound erected over it to indicate the spot. On the summit of the mound the implements of the gin—a yamstick ("wanna") and a cooleman ("mika")—had been stuck in the sand in an upright position, almost as a tombstone might be erected. (See Plate VI., fig. 1.) All the belongings of the gin, moreover, were hidden among the branches of the trees close by. A singular feature of the grave was that, on the northern side of the mound, a hole passing straight down to the body, and only loosely covered at the surface with a few branches of mulga, had been left open. The object of leaving this hole open I was not able to ascertain, but Professor Spencer subsequently informed me that a similar hole is left in graves in other parts of Central Australia to permit of the exit of the spirit of the dead person. In any case it would greatly facilitate the unearthing of the body by the wild dogs. No native was encountered within miles of this grave, although tracks, not many days old were plentiful. The superstitious beliefs and fear concerning the dead, it may be mentioned, are astounding. The fact that I had collected a native's skull, which had been disinterred by the dingos at Opparinna Spring, was quite sufficient to induce an old blackfellow and family camped close by to desert the locality in terror. No gin, moreover, is on any account allowed to even mention the name of either a deceased father or husband.†

Tradition and Folk-lore.—Further, the country abounds in tradition—tradition in contradistinction to history. All their complicated rites and customs have been handed down year after year without apparently conveying any real conception to the

* Compare Spencer and Gillen: "The Native Tribes of Central Australia," p. 497.

† Compare the statement: "The name of the departed is by no means ever mentioned, not out of respect, but out of fear" ("The Folk-lore, Manners, Customs, and Languages of the S. A. Aborigines," p. 27); and, "This is not, however, strictly true as regards the Arunta Tribe" (Spencer and Gillen: *op. cit.*, p. 498); also, E. C. Stirling: *op. cit.*, p. 168.

natives as to their significance. Of equal interest is the native folk-lore, which is often connected with certain physical features of the land. Gosse's Waterhole, on the Marryat, is known to the natives as Würmikattidinji—a word which draws attention to the fact, so far as lore goes, that the waterhole is inhabited by a huge snake, which, however, no native remembers having ever seen. Mr. Carruthers, in making reference to the scarcity of native camps at Ernabella Spring, in the Musgrave Ranges, states*:—"We found very few old native camps at this place, the reason being, from what I could gather from the blacks, ... a superstitious dread of 'cootachies' (devils), who, they imagine, inhabit the waters and caves in this locality."

Pastimes.—The native mind is not without constructive reasoning for the entertainment of his children during his leisure. Kurrekapinnya Soakage, in the Ayers Ranges, has evidently been a favorite camping ground of the natives when other surface-waters in the neighborhood have become dry. The very numerous designs sketched upon the roofs and walls of the shelters close by more than support this statement. It was at this native soakage well that a smooth track running for some distance down the inclined surface of a bare granitic outcrop at once attracted my attention, the cause of which, however, was not at first obvious; but my curiosity on this point was satisfied at sundown, when a little native girl called Unnrubinna, in the company of her mother, made her way to the well, and, while the adult was engaged in collecting water to take to her camp, the girl seized a bundle of rushes and, in all haste, made for the top of the track. Sitting down upon the rock, and placing the rushes underneath her, she began a slide down the incline of gneiss the pace of which gradually increased right down to the soft bed of sand at the base of the hill. The track, therefore, represented a native "toboggan." The girl continued playing in this manner for a considerable length of time, and I think the smoothness of the rock along this track may, without doubt, be ascribed to the effects of the continual abrasion produced in this manner for many years past. We have thus an instance of contemporaneous evolution of sport, when one considers the similarity of this pastime of the natives to the practice of sliding down staircase railings and inclined embankments by the children of the civilised world. (See Plate X., fig. 2.)

Other Peculiarities.—As regards rumors reporting the natives to be cannibals, little reliable information could be gathered. On putting the question direct the usual reply would make reference to the Wilrurrerra. It appears, however, that during very bad seasons the youngest of the children are killed. This act, Prof. Spencer holds, is performed to provide food for an elder child.

* Report to Surveyor-General: Adelaide *Observer*, Jan. 16, 1892, p. 9.

All natives have a wonderful power of mimicry. How true to nature the cries of birds can be imitated in the supposed healing of sickness has already been alluded to. Gestures are imitated with no less accuracy.*

The arrival of our party of white men caused among the natives no little excitement and often fear. The great "waipella" (whitefellow) had been personally seen by several of the older members of the various tribes that had come into contact with former exploring expeditions, the first of which dates back as far as the early seventies of last century (Gosse and Giles). Those who had not seen the white man before were, nevertheless, well acquainted by tradition with his feats. First and foremost, the deadly effect of firearms was generally known; most of the natives encountered would shudder at the sight of a rifle or revolver. In this respect considerable difficulty was at times experienced in getting natives to stand while they were being photographed. They apparently mistook the camera for a gun, and would endeavor to escape or crouch behind one another.† Yet in the most remote districts natives were occasionally encountered who would not show any signs of discomfort at the sight of firearms. That they had seen or at least were familiar with the existence of the white man is evident from the fact that "white-fellow tracks" are found among their crude cave-drawings.

The historic beast of burden, the "kamellie," forms an object of admiration and respect.‡ It is the ambition of the native youth to have the privilege of a short ride upon the hump of a camel, although he is quite unaccustomed to that kind of locomotion.

An infant held in the arms of her mother became so terrified at the sight of a white man that violent hysterical crying ensued. The breast of the mother being of no comfort to the little one, the gin lifted the head of the child, pointed in a direction in which camels were to be seen grazing, and uttered the words, "Kamellie, kamellie!" The sobbing of the piccaninny was at once converted into a broad smile.

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* In the Tomkinson Ranges a body of some two dozen natives approached the camp with their dingos. I was anxious to find out if the wild dog would pay heed to the generally adopted mode of attracting the canines. Upon applying the call I was somewhat startled to find the whole body of men imitating my actions to a nicety! On another occasion all the members commenced clapping and blowing on their hands upon seeing one of us do it to remove the dust from his hands after carrying rock specimens. The serious demeanor maintained during these antics adds strikingly to the effect upon an observer.

† Plate IX., fig. 2, shows an instance of this kind. The face of a terrified native will be observed peeping from behind the old man immediately to the side of his left shoulder.

‡ I subsequently learnt that a former exploring party had five camels speared by natives in this region.

PART II.—NATIVE ART.

During the passage through the ranges several opportunities were afforded of examining native cave drawings and primitive rock scratchings. The latter are made by simply scratching an angular fragment of rock upon the surface of a larger outcrop in such a way as to result in the formation of crude designs and imitative reproductions from nature.

The first example of this type of native art was found in the Mann Ranges in the form of scratchings made upon the surface of an outcrop of diorite. (See Plate XI., fig. 1.)

Starting consideration of the designs with the top row from left to right, we have as the first a hooked design,* whose interpretation is ambiguous, although possibly it is intended to represent a snake track. Following this we have one of those simple figures to which white man so readily gives the meaning of a "corroboree circle," being at the same time in utter ignorance himself as to its precise significance. The large emu track on the right speaks for itself. Following up the bottom row a similar U-shaped curve lends no further clue to its explanation than the hook immediately above it.† The next group is undoubtedly meant to represent a bustard (*Eupodotis australis*) track; the elongated central toe of the hinder imprint and the incomplete connection of it with the front are surely drawn to imitate the manner in which the bustard lazily scrapes the central toe along the surface of the ground when walking leisurely and unmolestedly. The meaning of the largest and central design, representing two circles one within the other, crossed by two arcs that intersect almost at right angles, is unknown. The last representation must be considered the same as the second.

Scratchings of a similar nature and also upon the surface of diorite were observed in the neighbourhood of Mount Crombie, south of the Musgrave Ranges. (See Plate XI., fig. 2).

These designs were comparatively fresh. Chippings of the rock and other signs indicated that the site of the markings had

* This curve and the one below it are not unlike the "Churinga Ilkinia of the Ulpmerka" figured by Spencer and Gillen: The Native Tribes of Central Australia, fig. 133. Their conspicuous position, however, does not support this explanation.

† Similar U-shaped curves have been noted by Helms: Trans. Roy. Soc. S. A., vol. xvi., Part III., Plate XII.

formed a temporary resting-place of the natives, apparently while out hunting. The figures were in all probability made while the blacks were in conversation with one another, and their meaning is not clear. They are quite similar to the sketches reproduced by Helms in the Anthropology of the Elder Expedition,* and to the "unripe plum" of the Plum Tree Totem of the Ulpmerka, figured by Spencer and Gillen.†

On the southern side of the Musgrave Ranges, upon a vertical wall of granite rock, directly above Naveena Rockhole, designs have been scratched that must be considered, in part at least, foreign to the district, inasmuch as they include representations of boomerangs, weapons that are not employed by the natives of these ranges. The groups of circles that accompany the boomerang-like figures may possibly represent chest ornamentations. (See Plate XI., fig. 3.)

At a soakage well east of Artootinna, in the Everard Ranges, a peculiar scratching upon the bare granitic rock resembled the shape of a bow and arrow. This is the only sketch of the particular kind at the locality, although a few chains west of the spot a small cave contains a few rock drawings on its walls.

Now and then (*e.g*, Ernabella and Giles West Camp) emu tracks were found carved in the bark of gum trees.

At Kurrekapinnya Soakage, in the Ayers Ranges, very numerous cave drawings exist, which will be described further on. Among these, many crude designs had been drawn with a fragment of charcoal. (See Plate XI., fig. 4.) The drawings include representations of bustard and kangaroo tracks (the elongated central toe of the former being characteristic of some of the figures), concentric circles, necklaces ("amuttara"), and certain inexplicable and other delineations, of which better illustrations follow.

At Ulurinna Native Soakage Well, moreover, upon the granite walls of a small cave several drawings in charcoal and red ochre of the pattern shown in figure 5 of Plate XI. were found. What they are meant to represent is a matter of uncertainty, although one or two of the figures approach the shape of a kangaroo track. They have been drawn with charcoal and are surrounded by a border of red ochre.

Upon teaching some members of the Karkurrerra Tribe, in the vicinity of Erlywanyewanye Waterhole, south of the Musgrave Ranges, the use of a pencil, I succeeded in obtaining a few original drawings on paper. These, during the time that they were constructing the designs, would repeatedly ejaculate their

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* *Idem. op. cit.*, Plate X.b, page 263.

† "The Native Tribes of Central Australia," page 632, figs. 133, 16.

respective meanings. Fig. 1 contains *fac-simile* reproductions of such drawings :—

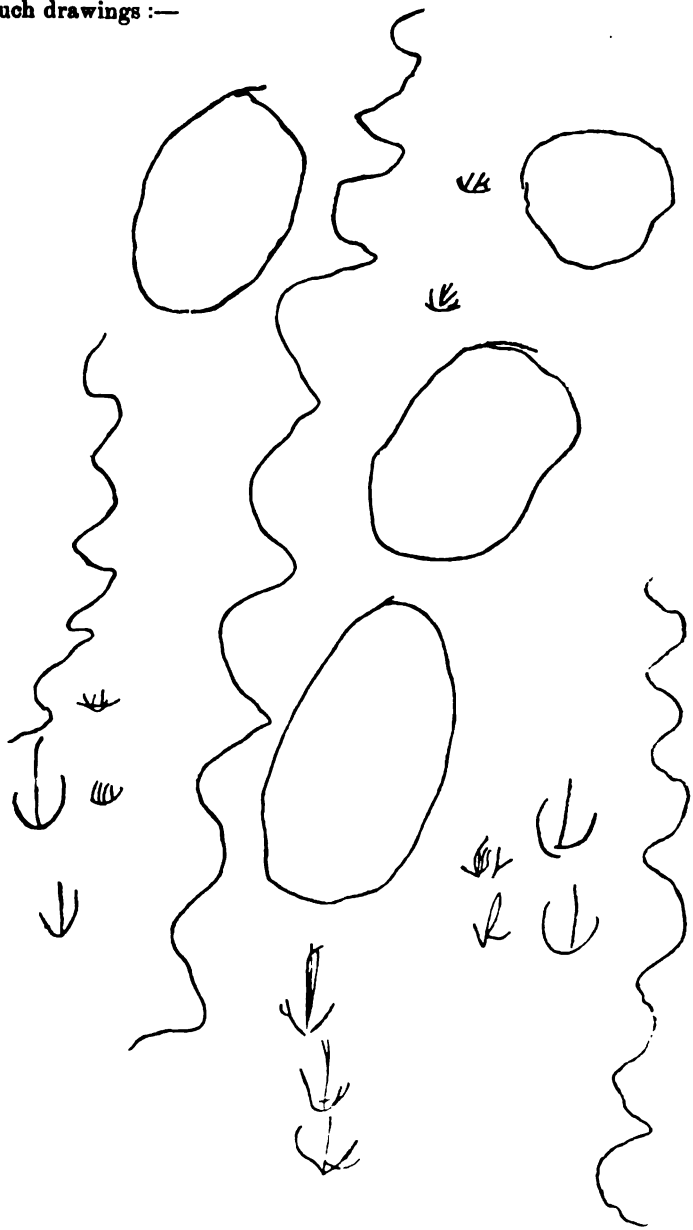

FIG. 1.—FAC-SIMILE OF NATIVE DRAWINGS, KARKURRERRA TRIBE.

The snake tracks, which were drawn while excitedly uttering the word "würmi" (snake), convey no more to the mind than the zig-zag course of the motion of these creatures. The other designs—representations of the tracks of emu ("kalēya"), kangaroo ("kanallă"), and dingo ("pāpă")—need no further comment, except that the dog-tracks are poor and incorrect as far as the number of toes is concerned. The novelty of the use of a pencil must be considered when examining these sketches. The circles were invariably drawn with the explanation of "inma," meaning "corroboree."

Rock Drawings.

To deal with the rock drawings, it will be advisable to consider each of the accompanying plates separately. The drawings have mostly been made in ochre of various tints, charcoal, white ashes, kaolin, and possibly burnt gypsum, mixed with water to produce a convenient paste. They have almost invariably been executed by dabbing it on with finger and hand.

Many of the designs have a real significance, in that they are attempts to represent the external form of every-day objects; some might have assisted to demonstrate graphically a verbal explanation or description; and others have no real significance at all, merely representing a concoction of idle thoughts that pass through the mind of the native. Few of the drawings correspond in form to that of actual objects, with which the natives can hardly be expected to be acquainted. These must be regarded as accidental similarities.

Many of the caves being but two or three feet high, the drawings must of necessity have been executed by the native in a recumbent posture, a fact which makes reproduction of the same into a note-book very awkward indeed. It appears, further, that many of the drawings are made during the hot summer months. The caves in which they were found were usually situated close to permanent waters, and they are no doubt used as a shelter against the sun. That the caves are re-occupied every season is evident from the fact that, in some instances, one design has been painted over the other, time after time, and year after year. The walls have, indeed, in cases, become so covered with drawings, successively painted one over the other, that not even a small portion of the original rock remains visible.

The greater portion of the rock drawings found during the expedition is represented in Plates XII. to XXI., and the following statements as to the significance of their details may now be given :—

Plate XII.—The cave in which these drawings were found occurs in porphyritic granite in Garnet Glen, Mann Ranges. Its walls have become blackened as a result of the frequent burning of fires within the same.

FIG. 1.—For an aboriginal this sketch is excellent. It undoubtedly represents a kangaroo; this being strongly suggested by the powerful tail and large hind legs. The excellence of the drawing lies in the segmentation of the limbs, the distinct snout, and general sense of proportion. Length, 13 in.

FIG. 2 represents a hand, bearing in its centre a red emu track. The hand, which is of about natural dimensions (8 in. long), it will be noted, possesses six fingers. Whether this fact is in allusion to such an abnormal case as cited in the Anthropology of the Elder Expedition* is questionable. More probably it is an arithmetical slip on the part of the native, whose notion about number is so very vague.

FIG. 3.—A chest ornamentation similar to that considered on page 20. The individual circles vary from 1½ to 2 in. in diameter.

FIG. 4.—Two correctly depicted wild dog tracks that have been constructed by employing the imprint of the thumb for the "pad" and that of a finger for the toes. The tracks are each surrounded by a ring 3 in. in diameter.

FIG. 5.—A doubtful design, 3½ ft. in length.

FIG. 6.—No doubt meant to represent a boomerang, although this weapon is not used in the locality. Length, 17 in.

FIG. 7.—Ditto. Length, 12 in.

FIG. 8.—An emu track.

FIG. 9.—On showing this to the blacks they pointed to their ears, which, therefore, it may be intended to represent.

FIG. 10.—This group of designs includes two series of concentric circles ("inma"); a long serpentine curve, probably without any real meaning; and numerous rabbit and bustard tracks.

FIG. 11 depicts a kangaroo track.

FIG. 12.—A long snake track.

FIG. 13.—A boomerang, 3 ft. long.

FIG. 14.—A spiral curve, the outer ring of which joins and approaches a circle. Probably a corroboree decoration, although an eye has been suggested.

FIG. 15.—Poor representations of dingo tracks, the number of toes being incorrect.

This cave further contained, in a separate portion, the design shown in Fig. 2. If the explanation given by a native (not the artist himself) is to be believed, it might represent the route taken by a man when out hunting, or on some other journey. The small, irregular lower figure might, on that conjecture, have reference to some natural feature—such as a native water. Total length of sketch, 4½ ft.

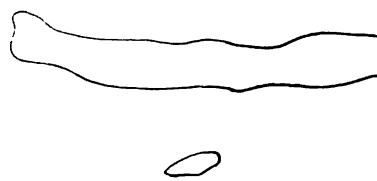

FIG. 2.—AN EXPLANATORY SKETCH BY A NATIVE.

* R. Helms: Trans. Roy. Soc. S.A., vol. xvi., Part III., page 306, Plate XXXVI.

Plate XIII.—Rock shelter north of Mount Whinham, Mann Ranges. This shelter exists high up on the hill slope on the northern side of the ranges, and is determined by an overhanging face of granite.

Fig. 1.—The most prominent drawing is that of a large snake, 7 ft. 6 in. in length, and is conspicuous even from the base of the hill. The drawing is in solid black, outlined with white. Two features of the figure are peculiar: a distinct but incomplete enlargement in the position of the head, and a black spine-like projection from the end of the tail. With regard to the latter feature, Professor Spencer suggests that it probably indicates that the artist intended to represent on a large scale a deaf adder (*Acanthophis*), which occurs in these parts, and is remarkable for the possession of such a spine.

Fig. 2.—This design measures 2 ft. 4 in. by 1 ft. 7 in., and has been drawn in the same colors as the sketch just mentioned; and the only meaning I can very doubtfully suggest is that it represents two crossed boomerangs, the lines of crossing having been omitted.*

Fig. 3.—The imprint or track of a right human foot, the correct number of toes being in this case shown.

Fig. 4.—Possibly this figure was intended to demonstrate a pattern of chest-scarring. It is not without resemblance to the design of the "Plum-tree Totem" figured by Messrs. Spencer and Gillen.†

Figs. 5, 5a, 5b, and 5c are rather good representations of dog tracks.

Figs. 6, 6a, and 6b illustrate the imprints in the sand of a bustard's foot.

Figs. 7, 7a, and 7b.—Kangaroo tracks, some of which show the imprint left in the sand by the side-toe; others are without it.

Fig. 8.—Meaning not apparent.

Fig. 9.—Similar to fig. 9 of Plate XII.; suggesting the shape of an ear.

Fig. 10.—Somewhat similar to fig. 5 of Plate XII.

Fig. 11.—Professor Stirling suggests that this figure might well represent a small "waddy," or throw-stick, though this kind is not actually used in the region.

Fig. 12.—An inferior representation of a snake track.

Plate XIV.—Native drawings found in a large rock shelter in granitic rock at Kurrekapinnya Soakage Well, Ayers Ranges.

Fig. 1.—The meaning of this figure is not evident; it simulates a drawing reproduced by Dr. Stirling.‡ Length, 2 ft.

Fig. 2.—Another doubtful representation. Dr. Stirling has pointed out the resemblance of a somewhat similar figure § to a *fœtus in utero*, without, however, pretending that it is meant to represent this. Dimensions: Length, 18 in.; breadth, 17 in.

Fig. 3.—See Plate XII., fig. 10.

Figs. 4, 4a, 4b, 4c.—Perhaps these designs are meant to represent necklaces ("amuttara"), such as are worn by many of the Northern Territory tribes; or they possibly illustrate the "moiranje," or fan-shaped tassel that is attached to the pubic

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*A similar design appears on Plate XII. of the "Anthropology of the Elder Expedition."

†"The Native Tribes of Central Australia," fig. 133, 2 and 14.

‡E. C. Stirling: Anthrop., Horn Exped., Plate IV., fig. 8.

§*Op. cit.*, Plate III., fig. 13, page 189.

hairs of the men.* The drawings vary in length from about 6 in. to 1 ft.

FIG. 5.—Probably a chest ornamentation or other corroboree decoration. The only explanation that I could acquire from a resident native was that of "inma-nuirrti" (corroboree rings). The total length of the design is 3 ft. 6 in.

FIG. 6.—Possibly a diagram of a shield. It is somewhat similar to the one pictured by Mr. Helms.†

FIG. 7.—A very interesting drawing, illustrating, in plan, the method of camping of a black and his gin. The longer curve, on the right, represents the male, the shorter the female, the dots on either side the fires, and the top curve the brush-wood shelter that is constructed at the heads of the sleepers on the windward side of the camp. This sketch was explained to me by a native of the Karkurrerra Tribe.

FIG. 8.—Depicts the tracks of a wallaby that is being pursued by a native from left to right. The paired tracks represent those of the game, and the intervening oblique marks those of the hunter. The design was continued for a greater distance than is shown on the plate.

PLATE XV.—Kurrekapinnya Soakage Well (continued).

FIGS 1, 2, 3 represent snakes or snake tracks; 4, 5, and 6 being rather doubtful. The large designs are many feet in length.

FIG. 7.—Bustard tracks.

FIG. 8.—Bustard and rabbit tracks.

FIGS. 9 and 9A.—Kangaroo tracks.

FIGS 10 and 10A.—Similar drawings appear in the Anthropology of the Elder Expedition.‡

FIG. 11.—An emu track.

FIG. 12.—The "circle within circle" design of corroborees (?). The remaining designs are not obvious, though they may, perhaps, belong to the category of those connected with corroborees.

PLATE XVI.—Kurrekapinnya Soakage Well (continued).

FIG. 1.—This design, which is 3 ft. in length, suggests the skeleton of a snake, though, but for its great length, it might well be taken to represent a centipede, the obliquely set lines at one end being intended for its "feelers."

FIG 2.—Of unknown significance.

FIG. 3, 3A, AND 3B.—Concentric circles. See Plates XII., XVIII., and XXI.

FIG. 4.—A spiral design, probably connected with corroboree decoration.

FIG. 5.—The same explanation as that given for fig. 1 may possibly apply here also; it is 2 ft. long; and it had been done, in the first place, in yellow ochre, and subsequently re-drawn in red.

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* An identical sketch has been reproduced by Mr. Helms in the "Anthropology of the Elder Expedition." He states that it "is undoubtedly meant for a fringed apron, as is worn by some tribes after certain rites have been performed upon the wearer."—Trans. Roy. Soc. S.A., vol. xvi., Part III., page 261. They are certainly like the waist-girdle described by Spencer and Gillen. —*Op. cit.*, pages 572 and 573.

† *Op. cit.*, Plate IX., page 262.

‡ R. Helms: *op. cit.*, Plates IX. and XIII. Compare the drawings of the "Plum-tree Totem": Spencer and Gillen, *op. cit.*, fig. 133.

FIG. 6.—This is not unlike a sketch made for me by a native with a pencil, with the intention of representing a dingo track (referred to on page 40). It is 4 in. long.
FIG. 7 was described as a corroboree mark ("inma") by the natives.
FIG. 8 probably depicts a native camp, as in fig. 7 of Plate XIV., the fires and shelter having been in this case omitted or obliterated.
FIG. 9.—A necklace (?) or fringed apron, as on Plate XIV.
FIG. 10.—Possibly a design of chest ornamentation.
FIG. 11.—Plan of a native camp (see Plate XIV., fig. 7), showing position of fires, but no shelter.
FIG. 12.—Bustard tracks.
FIG. 13.—Similar to fig. 5.

PLATE XVII.—Kurrekapinnya Soakage Well (continued). These elaborate drawings filled several square feet in area on the walls of the rock shelter, and probably have connection with one of the sacred ceremonies. They were again simply pointed out as "inma" by the natives.

PLATE XVIII.—Drawings upon the roof of a granitic rock shelter at the base of Mount Sir Henry, in the neighborhood of Ulurinna Water, Ayers Ranges. The designs chiefly represent tracks of various animals.

FIG. 1.—A splendid drawing of a snake, 5 ft. in length. The head is markedly differentiated.
FIG. 2.—Tracks, about 4 ft. long, of monitor (*Varanus*) or other lizard.*
FIGS. 3 and 3A.—Snake tracks, the latter being 3 ft. 6 in. long.
FIG. 4.—Chain of connected concentric circles.† The largest is 5 in. in diameter.
FIG. 5.—Concentric circles, which have frequently been referred to.
FIGS. 6 and 6A.—Dingo tracks. (See Plate XVI., fig. 6).
FIGS. 7 and 7A.—Kangaroo or wallaby tracks.
FIG. 8.—Compare with Plate XVI., figs. 1, 5, and 13.

PLATE XIX.—Sketches upon the roof of a very low rock shelter, in granitic rock, north-west of Opparinna Spring, Musgrave Ranges :—

FIG. 1.—This group of man and emu tracks probably illustrates a blackfellow in chase of an emu ; at the end of the series (fig. 1a) the two kinds of tracks are intermixed, which, we may imagine, represent the "kill." It will be noted that the man tracks have three toes only in each case.

The remaining drawings require no explanation. They include a large emu track (fig. 2), kangaroo track (fig. 3), a group of emu tracks (fig. 4), and a snake track (fig. 5).

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* See also E. C. Stirling : Anthrop., Horn Exped., Plate III., fig. 3.

† Compare the designs on Plate IX. of the "Anthropology of the Elder Expedition," and the sacred drawings associated with the Honey-ant Totem in the Warramunga Tribe described by Spencer and Gillen in "The Native Tribes of Central Australia," fig. 131, page 631.

Plate XX.—The cave in which these drawings were found is situated a few chains north of that to which those of the previous plate belong, viz., Opparinna, Musgrave Ranges.

Fig. 1.—A good drawing of a snake, nearly 4 ft. in length. It was drawn in red ochre, lined with black (charcoal). The poor state of preservation of this figure has necessitated partial reconstruction of the outline.

Fig. 2.—Doubtful.

Fig. 3.—Upon asking the natives for information about this design, the only reply one could get was "picaninny." If this be a correct interpretation of the figure, the absence of head and legs is remarkable. The striping of the design is, moreover, peculiar. What appears more likely is that the figure is a copy of a striped shirt or guernsey, which may have been presented to the natives by a previous exploring party. To account for the explanation of "picaninny," one might assume that the garment had been used to clothe the child. Dimensions, 20 in. by 29 in.

Fig. 4.—Judging from the symmetry of this design, it in all probability illustrates a chest ornamentation. Under that view, the spiral portions of the design would probably have been painted over the two breasts, and the large broad-arrow-like portion over the abdomen. Its dimensions are: Length, about 16 in.; breadth, 18 in.; diameter, of the circles enclosing the spirals, about 8 in.

Fig. 5.—Probably represents a shield, 11 in. long.

Plate XXI.—Drawings from rock shelters in the Musgrave Ranges. Of these figures, 1, 2, and 3 were from the southern flanks of the ranges not far east of Jacky's Pass; the remainder occur upon an overhanging joint face of granite at Giles's West Camp.

Fig. 1.—The shape of the two ends suggests the head and tail of a lizard, but it seems inconceivable that the artist should have multiplied the legs to the extent he has. It is drawn in charcoal, surrounded by red ochre, and is 19 in. x 7 in.

Fig. 2.—Representation of a boomerang, 1 ft. long. See Plates XI. and XII.

Fig. 3.—Very many feet of these paired kangaroo tracks covered the walls of the cave, and the figure represents portion of a track 6 ft. in length.

Fig. 4.—Concentric rings, alternately red and white in color, the largest 9 in. in diameter.

Fig. 5, 5A, and 5B.—Have been discussed before.

Fig. 6.—Plan of a native camp without the shelter at the head. See also Plates XIV., fig. 7, and XVI., fig. 11.

Fig. 7.—Doubtful.

Fig. 8.—A bustard track.

Fig. 9.—Poor drawings of dingo tracks, the toes being deficient in number in two of them.

Fig. 10.—These figures probably depict the track of a white man's boot, the enlargement at the lower end of the figures representing the heel of the boot. The lowest member of the series is drawn in white (kaolin), the remaining in red ochre.

Fig. 11.—Various designs of kangaroo or wallaby tracks.

In conclusion, I wish to acknowledge my indebtedness to Professor E. C. Stirling, C.M.G., F.R.S., of this city, and Professor Baldwin Spencer, C.M.G., F.R.S., of Melbourne, for their valuable criticisms and suggestions on various points of the paper; and to Dr. J. C. Verco, President of this Society, to whose liberality the reproduction of the accompanying plates is due.

APPENDIX.

VOCABULARY OF THE KARKURRERRA TRIBE; OR "WONGA-TCHITCHE" (LANGUAGE OF THE TRIBE).

In this Vocabulary the orthographical system of the Royal Geographical Society has been adhered to as far as possible. Any slight additions thereto will be noted.

Language	Wonga	Kangaroo (*Macropus rufus*)	Marlu
Woman (lubra)	Kunnga	Euro (*Macropus robustus*)	Kanällä
Young woman	Wanyi	Wallaby (*Petrogale lateralis*)	Waru
Mother-in-law	Wumaru	Dingo (*Canis dingo*)	Pāpā
Belly	Wila	Tail	Wipū
Eyelashes	Ngimbī	Ground	Munnda
Eyebrows	Ungirri	Rock	Kartu
Nasal fibrillæ	Orrū	Sky	Illkarri
Knucklebone	Gunna gunna	Cloud	Martörri
Tongue	Gölli (Dallin)	Star	Kilelp
Eye	Korru	Moon	Bira
Nose	Mulla	Sun	Jinta
Ear	Binna	Dark night	Monanka
Teeth	Kaditi	Noon	Jinta kalkalkū
Hair	Kātamonka	Dusk	Tchikalkutipa
Beard	Ngannngurrū	Venus	Ukurridchikurridchi
Ankle	Mörtull*	Southern Cross	Warrida jinna
Hand (or Finger)	Mairra	Wind	Wöllpa
Fingernail	Mairra-pīrī	Creek	Karu
Foot (or Toe)	Jinna	West	Ulbarera
Toenail	Jinna-pīrī	Fire	Wärru
Knee (or Kneecap)	Mordi	Charcoal	Yölda
Thighbone	Dundā	Ashes	Ono
Elbow	Gnūkū	Smoke	Ngādī
Calf	Jirrar	Act of subincision	Kallokulldano
Navel	Pullī	,, circumcision	Delldinge
Testes	Okullgö	Medicine man	Nangarri
Vulva	Tchuka		
Anus	Kunnatörn		
Penis	Kürlu		
Breast (female)	Epi		

* I found it necessary to employ the modified forms (ö umlaut) of o and u, the value of the sound being quite the same as in German.

Spear	Oiritchannā
,,	Kādtī
,, (without the barb)	Winta
Spear-thrower	Mēro
Trough - shaped carrier (large)	Mika (Wira)
Trough - shaped carrier (small)	Dokollkō
Hand stone for native mill	Mirī
Grinding stone for native mill	Tchĕwa
Yamstick	Wanna
Small bone used by medicine man	Darrekĕ
Stone "knife"	Gadorg (Nyilla)
White strands of twisted fur worn round forehead	Wil karru (Nannbā)
White strands of twisted fur worn round arm	Armakurrekĕ
A form of necklace described in the text, passing once round the neck and under the left shoulder	Putörro or Puttarra
Rod worn through nasal septum	Delonngu
Scars on chest	Tchiparre
,, on arm	Ngarlarrekin
Gum	Kēdti
Ochre	Dürrtu
Operating flint	Kalluwila (Gūnnditi?)
Yes	O, owā, u, ūwa, ōwau, ūwau (according to emphasis required)
No	Wiya
Mine	Nayuka
Yours	Ngorūmmba
Another one	Kutipa
To-day	Goarī
Spider	Wūnnga
Grub	Elljalitti makū
Centipede	Wānajitti
Caterpillar	Anōmarre
Mantis	Gāwall
Butterfly	Benda bendā
Beetle	Müttumutt
Grasshopper	Jendilk
Blowfly	Būbūlērī
Lizard (chadny)	Ngabolla

Moloch horridus	Menerrē
Snake	Würmī
Apus australiensis	Dobūllabūlli
Emu	Kaleya
Emu-Feather	Kaleya wipia
,, -Breastbone	Ngarrek
,, -Egg	Kaleya ngambu
Curlew	Willō
Flower	Jindā Jindā
Sarcostemma Australe	Epi epi
Eucalypt	Opera
Casuarina Decaisneana	Kurrekarra
"Mulga" (*Acacia aneura*)	Korreku (Parreka)
Acacia seed	Mulle
Portulaca seed	Wākādī
Mulga gall (edible)	Jarrūllge
Pituri (*Duboisia Hopwoodii*)	Peturr
Water	Kapī
Metal	Tellurambu
Honey (Ant's)	Worma (?)
Spittle	Wīda
Excrement	Kunna
Exclamation denoting appreciation	Hm! Hm!
Plenty	Ura, Uraku, or Uraku-pu (according to emphasis required)
Much	Punnda
Little	Wimuggitā
Scared	Ngūloo
Be afraid	Nguluringanyē
Be tired	Pullkarringanyē
Leave alone	Wunndī
Give me	Pakenai nguwa, or pākayuā (contracted form)
Walk	Kullpannyē
Run	Wörteböganni
Throw	Wonnē
	Marwonninye
Dig (with stick and hand)	Towalē or towannī
Pinch	Menndī
Kick	Ganndola
Be hungry	Amma (?)
Look for	Ngakolakullpannyē
Laugh	Ennga
Cough	Gonndull
Sneeze	Narretchi (Narretchinnyā)
Jump	Bullgarrē
Cohabit	Tchuka moranni

Arrive	Ngāāliannī	My young lubra	Wanyī nayuka nganndtharri
One	Kudū		
Two	Kutarra	Far	Würnma
Three	Munngurru	Near	Illa
Four or more	Dūda	Good	Pullya (Palla)
Want a drink of water		Bad	Kuiya
	Kapi mantchegalle	Odorous	Punding
Want to eat	Māiī mantchegalle	Red	Ngallda
Poor fellow!	Wilunnga		

ABORIGINAL NAMES.

Names of Persons.

MALE.	FEMALE.
Immalangenna	Werejinna
Nginndawaparrikna	Ngungolganna
Kamanje	Junnjinga
Ngerongabarrennye	Nuranna
Dinjimanne	Unnrubinna or Unnruba
Waikillyarinna	Yarmenndinna
Jetominna	Ptumpalenna
Topintopin or Topintopingna	Mijagardonne
Kontchigorra	Konndiwanna
Wangunnana	Tcherokullyanna
Pimbakuta	Urabonna
Tallgurinnga	Immiarinnya
Yambilpabadonna	Pannjidinna
Tunndabilonna	Immanduranne
Maguaborrange	Perdinnya
Tumarinna	Katchiwalanne
Jinnāngalerrikuga	Tudabaiyanna
Jinnakularrikna	Unndabaganna
Kartakardonne	Manmadonna
Kinnigunne	Karlonda
Jinnamureryanna	Ngarnolin
Muranni	

Names of Dogs.

Dunnidunna	Pinmakki
Bunnibunni	Mäuiru

EXPLANATION OF PLATES.

Plate III.

Fig. 1.—Hair decoration worn by males, and known as "Döllgu Wipu." x $\frac{3}{4}$.

Fig. 2.—Necklace or "Olindu." x $\frac{1}{2}$.

Fig. 3.—Pubic tassel or "Moiranje," worn by males. Natural size.

Fig. 4.—Ceremonial object, known as "Wanningi." x $\frac{1}{3}$.

Fig. 5.—Hair (fringe) decoration worn by females, and known a "Dindula." Natural size.

Fig. 6.—Implement made by natives of the Karkurrerra Tribe. x $\frac{1}{3}$.

PLATE IV.

FIG. 1.—The honey ant (*Melophorus* sp.) distended with honey, or "Winudtharra" of the natives. Natural Size.

FIG. 2.—Hunting spear, or "Oiritchanna," showing the native names of the separate parts (Karkurrerra Tribe).

FIG. 3.—Spear thrower, or "Mero," showing the native names of the separate parts (Karkurrerra Tribe).

FIG. 4.—Native mill consisting of hand stone ("Miri") and grinding stone ("Tchewa") (Karkurrerra Tribe).

FIG. 5.—Native chest decoration. Ullparidja Tribe, Mann Ranges.

FIG. 6.—Diagrammatic representation of a native camp. The positions of the sleepers receive separate names according to whether they are on the outside or the inside of the row, as follows:—

A = Ituppulindoma
B = Mbuppolăindoma

F = fire
C = brushwood shelter, or "youo"

PLATE V.

FIG. 1.—A native wet weather hut, west of the Mann Ranges.

FIG. 2.—A natural rock shelter, Garnet Glen, Mann Ranges. Upon the roof and sides of this cave the drawings reproduced on Plate VII. were found.

PLATE VI.

FIG. 1.—A female native's grave, Glen Ferdinand, Musgrave Ranges. The so-called "cooleman" and "yamstick" of the deceased can be seen erected on the summit of the mound of earth. A hole in communication with the body exists underneath the dry branches of "mulga" in the foreground. See text.

FIG. 2.—Cave shelter, with aboriginal rock drawings, north-east Mann Ranges. For particulars see Plate VIII.

PLATE VII.

FIG. 1.—Females of the Karkurrerra Tribe, Musgrave Ranges (south). The two adult figures wear "nosesticks," and a form of necklace known as "Puttarra," which passes once round the neck, thence under the left shoulder. Their hair has been gathered into a "bob" in front.

FIG. 2.—Males of the Karkurrerra Tribe, Musgrave Ranges (south). The central figures are boys, not yet initiated. The photo also shows the method of camping, with the alternate placement of man and fire.

PLATE VIII.

FIG. 1.—Males of the Wilrurrerra Tribe, north of the Musgrave Ranges. The plate shows the method of holding spear-thrower and spear, and upward movement of left arm when hurling the weapon.

FIG. 2.—Female of the Wilrurrerra Tribe, north of the Musgrave Ranges, showing a common method of carrying an infant. The Musgrave Ranges show in the background.

PLATE IX.

FIG. 1.—Males of the Ullparidja Tribe, Tomkinson Ranges. The figure on the right is a youth, not initiated, who is being tended by an old man, prior to the ceremony of initiation. The picture

further shows a domesticated dingo *(Canis dingo)* in the background.

FIG. 2.—Natives of the Ulparidja Tribe, Tomkinson Ranges. The old native is explaining the relationship of his family.

PLATE X.

FIG. 1.—Females of the Karkurrerra Tribe, Musgrave Ranges (north). A second method of carrying a child is shown in this picture.

FIG. 2.—A native toboggan on a granite slope at Kurrekapinnya Soakage Well, Ayers Ranges. The girl-picaninny (Unnrubinna) is taken in the act of sliding down the smooth track.

PLATE XI.

FIG. 1.—Rock scratchings on diorite, north-east Mann Ranges.

FIG 2.—Rock scratchings on diorite, Mount Crombie, south of the Musgrave Ranges.

FIG. 3.—Rock scratchings on granite, Naveena Rockhole, Musgrave Ranges.

FIG. 4.—Charcoal drawings, Kurrekapinnya Soakage Well, Ayers Ranges.

FIG. 5.—Drawings, Ulurinna Soakage Well, Ayers Ranges.

PLATE XII.

Rock drawings, Garnet Glen, Mann Ranges.

PLATE XIII.

Rock drawings, north of Mount Whinham, Mann Ranges.

PLATE XIV.

Rock drawings, Kurrekapinnya Soakage Well, Ayers Ranges.

PLATE XV.

Rock drawings, Kurrekapinnya Soakage Well, Ayers Ranges.

PLATE XVI.

Rock drawings, Kurrekapinnya Soakage Well, Ayers Ranges.

PLATE XVII.

Rock drawings, Kurrekapinnya Soakage Well, Ayers Ranges.

PLATE XVIII.

Rock drawings, Mount Sir Henry, Ayers Ranges.

PLATE XIX.

Rock drawings, Opparinna, Musgrave Ranges.

PLATE XX.

Rock drawings, Opparinna, Musgrave Ranges.

PLATE XXI.

Rock drawings, Musgrave Ranges.

DESCRIPTIONS OF NEW SPECIES OF CORALS FROM THE AUSTRALIAN TERTIARIES.

By J. DENNANT, F.G.S.

[Read October 4, 1904.]

PART VII.

PLATES XXII. TO XXV.

FAMILY TURBINOLIDÆ.

GENUS FLABELLUM.

Flabellum medioplicatum, *spec. nov.* Pl. xxii., fig. 2.

The corallum is compressed, especially towards the base and at its lateral edges; these edges are crested, not only inferiorly, as in its near ally, *F. distinctum*, but also superiorly. The most characteristic feature of the coral is a strong medial plication on its anterior and posterior surfaces. This commences at the base, and becomes gradually broader and stronger as it ascends on the sides of the corallum. The base is prolonged into a straight tapering pedicel, which at the point shows a mark of former attachment. The whole surface is covered with a strong epitheca, which is crossed by several well marked transverse bands. These bands are convex and most prominent on the upper portions of the medial plications, where they form a series of crested ridges. Beneath the epitheca the costae are traceable as numerous, faint, and closely packed projections, broad at the summit of the corallum, but gradually narrowing as they reach the base. The central ones are straight, and continue to the extremity of the peduncle; the rest converge towards this point, but at the same time curve gently inwards. The wall is thin and thus easily fractured during fossilization. Owing to this the specimens obtained are all more or less imperfect.

The calice describes two convex curves which meet sharply at the lateral edges. Its major and minor axes are approximately as 100 to 56. In the type specimen one half of the calice is fairly well preserved and shows 50 septa, or 100 for the whole calice. On its medial boundaries the septa are apparently arranged in three orders, of which the first is fairly stout, and reaches to the central fossula, the second thinner and nearly as long, with the third very slender and much shorter. Towards the lateral edges the septa become alternately long and short.

The columella is rudimentary and deeply placed in the narrow fossula.

Height of a tall specimen, 48 mm. The type is evidently broken, and now measures 35 mm. from its summit to the base of the peduncle. The calice of another specimen is approximately 35 mm. long and 20 mm. broad.

Locality.—Abundant in the Spring Creek section.

I have adopted for this species the manuscript name given to it many years ago by my late colleague, Professor Tate.

F. medioplicatum is quite distinct from *F. distinctum*, which occurs abundantly and in good preservation in the same beds. The former not only differs from the latter in shape, but its calice contains a much smaller number of septa.

Flabellum microscriptum, *spec. nov.* Pl. xxii., fig. 1.

The corallum is compressed, pedicellate, deltoid in shape, and slightly keeled at the edges. The epitheca is complete and transversely ornamented with delicate, closely set, arched, and chevroned lines, which are occasionally raised in growth ridges. Longitudinally the surface is marked by very fine straight lines, radiating from the base to the summit. These represent the interspaces of the costæ. The latter are broad, but are only just traceable on the wall. The epitheca of the nearest allied species, *F. Gambierense*, has a similar but less delicate ornamentation.

The calice is narrowly elliptical, and has its minor axis on a higher plane than that of the major. The ratio of these two axes is in the example figured, the largest collected, as 100 to 55. The septa are sparsely granular, and in six systems with five cycles. All are slender at the summit, especially the higher orders. Lower down, the principal septa become stout, and unite across the axial space to form a strong parietal columella. The remainder vary in length according to order, and at the level of the columella are still very thin lamellæ. The wall is fragile, and the specimens found are usually much damaged. Out of 17 examples in my collection I cannot select a single calice sufficiently well preserved to serve for illustration.

Height of figured corallum, 31mm. Its calice is approximately 27 mm. long and 15 mm. broad.

Locality, etc.—In Wilkinson's No. 7 locality, two and a half miles east of the river Gellibrand, to which it is apparently restricted. It is accompanied by *Trochocyathus meridionalis*, Duncan, *T. Victoriæ*, Duncan, and *T. Wilkinsoni* (see post), which so far have only been found in this small outcrop. The only other coral discovered in it is the widely distributed *Flabellum candeamum*, Edw. and Haime. In addition to the corals a few species of mollusca have been obtained, several of which are new and peculiar to the section.

Flabellum Grangense, *spec. nov.* Pl. xxii., fig. 3.

The corallum is pedicellate, conical in shape, compressed towards the base, and scarcely so superiorly. The wall is moderately stout, and is covered with a strong epitheca. The costæ are plainly marked, equal, flat, broad, and separated by fine lines.

The calice is subelliptical, its major and minor axes being in the ratio of 100 to 94. The septa do not correspond to the costæ, but to the linear intervals between them. They are in six systems with four complete cycles. The primaries and secondaries are stout and equal; the tertiaries and quaternaries, especially the last, shorter and smaller. All are marked by rows of large, bluntly pointed granules. A rudimentary columella, formed by the junction of opposite septa, is visible in two examples, both of which are shortened by fracture. In the figured example, which is taller and larger, the columella is wanting, and the septa do not meet. A small fragment of shell has, however, become firmly fixed in a portion of the columella space.

Height, 19 mm.: approximate diameters of calice, 8·5 mm. and 8 mm. Only three examples have been found, none of which have the calice perfect. Though much less compressed than Flabella generally, there can be no doubt as to the genus of this coral.

Locality, etc.—In the Miocene beds at Forsyth's, Grange Burn. Collected by Mr. T. S. Hall and myself. Like the fossils generally in the Muddy Creek Miocene, the coralla have evidently been rolled.

GENUS PLACOTROCHUS.

Placotrochus magnus, *spec. nov.* Pl. xxii., figs. 4*a*, *b*, *c*.

The corallum is large, dense, and much compressed at the base, which terminates in a short, abrupt, flatly pointed pedicel. Above this, the faces incline outwards so as to form a broadly elliptical calice. The coralla are not uniform in general outline, and vary from deltoidal to almost cuneiform. The lateral edges are plain, sharp, and convexly curved from the base to the summit: the angle subtended by them varies according to the habit of the individual from an extreme of about 80° in the broadest to 44° in the most contracted form. The coralla figured represent the two most strongly contrasted forms collected; their faces are inclined in their middle lines at angles of about 45° and 36° respectively. The summits of the minor axes of the calice rise to a greater or less extent above those of the major, according as the examples vary

from broadly deltoidal to more cuneiform in shape. There is a corresponding difference in the actual lengths of these axes, but their ratio is tolerably constant for each individual, and about as 70 to 100. The wall is stout except towards the summit, where it becomes thinner. It is covered by a strong, coarse epitheca, which is faintly marked transversely by a series of broad ridges and corresponding but narrower depressions, having the same curve as the margin of the calice. The costæ are numerous and arranged in sets in which three very fine ones alternate with another slightly larger. They follow the contour of the edges, but can only be traced on the surface of well preserved specimens. In the deltoidal example figured the finer costæ fade away near the lateral edges, while the larger ones become more prominent. On the surface of this corallum, which is the finest collected, I counted thirty-two of the larger costæ.

The calice of an adult deltoidal specimen contains 112 septa of three sizes, viz., 28 stout, equal, and in appearance primary, an equal number thinner, but nearly as long, and 56 still shorter and finer. The calice figured is that of the cuneiform corallum mentioned, and has 54 septa on one side and 50 on the other. They are in 27 sets, two of which contain no septa of the third order. This calice is tolerably perfect, and a number of the primary septa, still intact, rise slightly above the margin. The free edges of the primary septa curve downwards towards the columella, and then descend vertically to bound the central fossa, which is deep, long, and moderately broad. For some distance from their free edges the septa are quite plain, but lower down their sides are marked by closely set, radiating rows of fine granules. The columella is a long, stout, perfectly plain, plate-like structure. It is in the line of the long axis, and being largely free it forms a conspicuous feature in the calice.

The dimensions of the deltoidal specimen taken as type are:—Height, 33 mm.: length of calice, 37 mm.: breadth of calice, 26 mm. The cuneiform specimen, of which both the corallum and calice are figured, is 35 mm. high, and its calice is 29 mm. long and 22 mm. broad. It is an extreme form, the other examples tending to deltoidal in outline.

Locality, etc.—Common in the Upper Eocene or Oligocene of Spring Creek, Victoria.

This species closely resembles *P. deltoideus*, Duncan, but is larger and heavier. It is also less attenuated at the base, while its lateral edges are characteristically convexly curved. Moreover, the hexameral arrangement of the septa observed in *P. deltoideus* is evidently wanting in *P. magnus*.

Genus Platytrochus.

Platytrochus Maudensis, *spec. nov.* Pl. xxii., figs. 6*a*, *b*.

Corallum minute, free, and much compressed, especially inferiorly. The lateral edges of the faces descend vertically for rather more than halfway from the summit, when they curve towards each other and meet in a roundly pointed base. The upper part of the corallum thus forms a rectangle and the lower a triangle, with the base as its apex. A white, shining epitheca covers the whole surface. Beneath it the costæ, which correspond with the septa, usually, but not always, show as broad, flat bands, with narrow interspaces; in the figured example they are exceptionally well marked for a short distance from the summit.

The calice is arched and higher centrally than at the wall. It is elliptical with the two axes in the ratio of 10 to 6. The septa curve upwards from the wall to their central terminations. They are granular, equal, and in six systems with three cycles. In the extreme lateral systems the tertiaries curve towards the primaries, and join them close to the columella; in the other systems this union is rarely seen. The secondary septa are always free. The columella is strong, nodular, and occupies a considerable space in the calice. In the type it consists mainly of three projecting nodules fused together by solid tissue; in other examples its outline is irregular and differs in every individual. There is, however, always a central linear portion which is joined by processes from the septal ends. One specimen, cut transversely a short distance below the upper surface of the calice, is solid centrally, the columella being completely fused with the axial margins of the septa.

Height of corallum, 4·5 mm.; length of calice, 2·5 mm.: breadth of do., 1·5 mm. The specimens are uniform in size.

Locality, etc.—Fairly common in the lower beds at Maude, on the Moorabool River (seven examples). These beds are usually classed as Eocene.

The corallum of this small species looks much like a worn *P. hastatus* with the spear-like base removed. Its calice, however, is nearer that of *P. curvatus*. The papilli of the columella, which characterise the genus Platytrochus, are, I think, in the Maude coral soldered into groups by secondary infilling.

Genus Ceratotrochus.

Ceratotrochus Australiensis, *Duncan* (var.). Pl. xxii., figs. 5*a*, *b*.

Conotrochus typus, Seguenza, var. Australiensis, *Duncan*, Q.J.G.S., vol. xxvi., pp. 298, 9. Pl. xix., fig. 8.

This coral, which is very common in the Australian tertiaries, differs in several respects from that described by Se-

guenza,* and subsequently by Reuss.† Its septa are less regularly disposed and the papilli of the columella are much less numerous. For *C. typus*, Seguenza gives 30 to 40 and Reuss 28 to 36 as the number of the papilli, whereas the Australian form contains from 6 to 12 only. Another distinction is that the latter has sometimes a considerable amount of endotheca in the calice, while no mention is made by either Seguenza or Reuss of endothcea in the European examples. Amongst my specimens there are three which show a notable amount of endotheca. In Duncan's figure the artist has clearly indicated some endotheca, and in the accompanying plates I give a drawing of a calice from Fyan's Ford with more still. For these reasons I propose to make Duncan's varietal name of the Australian form a specific one.

Locality, etc.—Eocene. West of Gellibrand River, (Duncan's type locality), Cape Otway, Shelford, and Fyan's Ford, Moorabool River. The figured example is from Fyan's Ford, and its pedicel has been broken off.

GENUS DISCOTROCHUS.

Discotrochus ? pateriformis, *spec. nov* Pl. xxii., figs. 7*a*, *b*.

The corallum is free, discoid, and very small. In shape it resembles a miniature dish, with an outwardly sloping perimeter. The base is flat, elliptical, smaller than the calice, and without trace of adherence. The costæ are broad, subequal, almost plain, roundly projecting, and continuous with the septa. Most of them reach the base, and are separated by interspaces equalling them in breadth, and having a very fine longitudinal ridge in the centre of each. The wall is stout and well marked at the calicular margin. Both the base and sides of the corallum have a white, glistening appearance.

The calice is subplane and elliptical, its major and minor axes being in the ratio of 4 to 3. The septa are exsert, stout, nearly equal in size, and closely beset on their sides with large, pointed granules. They are in six unequal systems with four cycles, of which the last is developed only in two and a half systems. The quaternaries, when present, are very short, and fuse with the tertiaries quite close to the wall. Occasionally also the tertiaries join the enclosed secondary at their inner ends. The columella is prominent, fascicular, and occupies considerable space in the calice.

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* Disqu. Pal. intorno ai Corall. Foss., Torino. Part II., pp. 83-5, pl. x., fig. 1.

† Foss. Korall. Osterreichisch-Ungarischen Miocans, Wien., p. 30, pl. iii., figs. 10-12.

Height, 2 mm.; length of calice, 4 mm.; breadth of calice, 3 mm. The base is 2 mm. long and 1·5 mm. broad.

Locality, etc.—The only example of this small coral was collected in the upper Eocene at Spring Creek by Mr. A. E. Kitson. Until other specimens come to hand, its generic position is queried. In several respects it closely resembles *Discotrochus Duncani*, Reuss, from the Miocene of Austro-Hungary.* Its septa and costæ are arranged on the same plan even to the fine ridges in the intercostal furrows. It also agrees in size, though it differs slightly in shape.

Genus Trochocyathus.

Trochocyathus Wilkinsoni, *spec. nov.* Pl. xxiii., figs. 4*a*, *b*.

The corallum is turbinate, slightly curved, and expands regularly from the short, contracted, pedicellate base to a widely open calice. The costæ are continuations of the septa, and consist of subequal, prominent, granulate ridges, which are separated by corresponding interspaces. An epitheca, very delicate superiorly, but gradually becoming denser towards the base, covers both the costæ and their interspaces. The wall is stout, especially inferiorly.

The calice is shallow and slightly elliptical, with its major and minor axes in the ratio of 100 to 82. The septa are in six systems with five cycles. Their margins and sides are beset with sharply pointed granules. The primaries and secondaries are moderately stout and subequal; the remaining orders diminish gradually in size. The quaternaries in each system unite with the enclosed tertiary, either on the surface or just below it, and from a half to two-thirds from the wall. The quinaries are rarely developed in both halves of the systems, and may be entirely absent in a whole system; when present, they fuse with the enclosed quaternary at about one-fourth from the wall. The pali are in two crowns, elongate, granular, irregular in shape, and placed before the first three orders of septa, the tertiary pali being much larger than the rest. The columella is fascicular, with a papillary surface, and fills the central fossa. The papilli present a confused appearance, and are not easily separable from the smaller, more central pali. The calice of this species much resembles that of *T. Victoriæ*, Duncan, but has an additional cycle of septa in some systems and a larger columella. The pali are similar in appearance, and in both species are really enlargements of the septal ends. Such corals are by authors generally placed in Trochocyathus.

* Op. cit., p. 29, pl. iii., fig. 13, and pl. iv., figs. 1, 2.

The specimen illustrated has its columella area partly choked. The calice of another and larger example, though broken down at its margin, is clearer, and the description given is derived principally from it.

Height, 10 mm.; diameters of calice, 11 mm. and 9 mm. The larger example mentioned, though slightly reduced by wear, is still 14 mm. high.

Locality, etc.—Rare in the Eocene outcrop just below Rivernook House, Princetown. I name the species after the late Mr. Wilkinson, who discovered the section, and noted it as No. 7 on his map of the Cape Otway coast (1865).

GENUS LEPTOCYATHUS.

Leptocyathus ? convexus, *spec. nov.* Pl. xxiii., figs. 3*a*, *b*.

The corallum is free, of compact appearance, almost crown-shaped, but longer than broad, and slightly compressed inferiorly. The base is flat, elliptical, and without trace of adherence.

The costæ are subequal, finely serrate on their edges, separated by narrow grooves, and in six systems with four cycles, of which the last is complete in two systems only, each of the remainder having this undeveloped in one half-system. From the base to the middle of the wall they are very broad, and then diminish gradually as they ascend. For about three-fourths of the circumference of the corallum all the costæ reach the base, but on one side the higher orders exceptionally join the tertiaries midway on the wall.

The calice is convex and elliptical, with its axes in the ratio of 100 to 86. The septa are highly exsert, and in reality merely arched continuations of the costæ, without defined boundary. Like the latter, they have dentate edges, but their sides are more strongly granular. They taper off towards the centre of the calice, and present the same arrangement of cycles and systems as the costæ. The principal septa are unequal, and the higher orders shorter and usually thinner: the latter are free superiorly, but fuse with the tertiaries just below the surface. The central fossa is small, excavated, and approximately circular. Its contour in the type calice is rendered somewhat irregular by an accidental fracture of some septa in two of the systems. It contains a number of small papilli soldered inferiorly to each other. Some of these represent the columella, while the outermost of them are probably the pali. In another very young specimen there are six elongated pali and a small nodular columella. There is no epitheca, and the wall is apparently formed by the costæ, which ultimately fuse together on the base.

The corallum is 4·5 mm. high, 5·25 mm. long, and 4·5 mm. broad.

In Edwards & Haime's description of *Leptocyathus elegans* from the London clay, very thin pali, placed before all septa, and a delicate papillary columella are mentioned.* Duncan's L. epithecata, which is described as an aberrant form of the genus, shows small broken-granular pali merging into a central columella, and only the larger septa have pali.† Pourtales refers a recent coral, *L. Stimpsoni*, to the genus with some doubt, and states that there are distinct pali before the secondary septa, while those before the other orders are scarcely distinguishable from the columella processes.‡ Lindström deals with the same species, but queries the genus. He says there are no pali and that the papilli of the columella may sometimes be mistaken for pali.¶ He also describes the recent *L.? halianthus* as having a similar papillose columella, which in part simulates pali.‖ Lindström's drawing of *L.? Stimpsoni* has somewhat the appearance of *L.? convexus*. The Australian coral has certainly the habit of Leptocyathus, as understood by the authors last mentioned, and may be provisionally referred to that genus.

Locality, etc.—In the Spring Creek section. Only two examples have been found, viz., those mentioned above. Collected by Mr. A. E. Kitson and myself.

Genus Deltocyathus.

Deltocyathus stellaris, *spec. nov.* Pl. xxiii., figs. 1*a*, *b*, *c*.

The corallum is free, discoid, and resembles in general form a plano-convex lens. Its under surface is horizontal, with a scarcely perceptible prominence in the centre, and without showing a trace of adherence. The costæ are in six systems with four cycles, which are nearly equally developed, and conspicuously radiate on the base. The three principal orders commence at the centre, and the fourth close to it as coarse, granulated lines, which then gradually become broader as well as higher towards the margin. Their interspaces similarly increase in width towards the edge, which is rendered regularly serrate by the equal projections of the costæ.

The calice is circular, almost flat, with a moderately large and shallow fossula. The columella is distinct, nodular on its upper surface, and fascicular beneath. The septa are

* Brit. Foss. Cor., pp. 21-2, t. iii., fig. 6.
† Foss. Corals of Sind., pp. 60-1, pl. iv., figs. 4-7.
‡ Deep Sea Corals, p. 12, pl. iii, figs. 1, 2, 3.
¶ Actinology of Atl. Ocean, p. 9, pl. i., figs. 5 to 8.
‖ Op. cit., pp. 9, 10, pl. i., fig. 9.

direct continuations of the costæ, the only visible boundary between them being the under surface of the corallum. They are in six equally developed systems, with four cycles, and show the delta-like combinations characteristic of the genus. In the several deltas, large, stout, and much raised pali are placed before the union of the short quaternaries with the tertiaries, a deep notch in all three septa marking the point of junction. At its outer end each palus consists of three separate processes, of which the central one is longer, higher, and more arched than the others. The solid portions of these pali taper somewhat, converge in each system, and then unite laterally with the enclosed secondary septum. The other pali reach the columella and are much smaller, especially the primaries, which are slender, much like the septa themselves, and united to them by thin, sunken processes; the secondaries are irregular in shape, more central than the tertiaries, and less conspicuous in the calice. All the septa and pali are similarly covered on their sides by closely set rows of stout granules.

Diameter, 10 mm.; maximum height (to summit of pali), 3 mm.

Locality, etc.—Rare in the Spring Creek section; five examples.

This species is at once distinguished from other Deltocyathi of the Australian tertiaries by its flattened outline, coarsely granulated costæ, and large tertiary pali.

Deltocyathus fontinalis, *spec. nov.* Pl. xxiii., figs. 5*a*, *b*.

The coralla are generally discoid in outline, rarely shortly cylindrical. They vary also in size. The base has a rounded margin, and may be flat, barely convex, or hollowed out centrally. A scar of former attachment is occasionally present. The costæ are finely granular, radiate on the base, and perpendicular, or nearly so, from the basal margin to the border of the calice, when they again curve round, and are continued as septa. They are equal, broad, and in six systems with four cycles. In examples with no basal scar the primaries and secondaries are traceable to the centre; the quaternaries fuse together near the centre and enclose the shorter tertiaries. The wall is thin, low, deeply seated, and rarely visible in the narrow interspaces of the costæ.

The calice is circular, slightly convex, or almost flat, with a shallow central fossa. The septa are unequal in length, stout, and very granular. The pali are also granular, and are placed before the first three orders of septa. Those before the tertiary septa are the largest and converge towards

the secondary pali, which, like the primary, adjoin tne columella. There is a distinct, papillary columella.

The figured corallum is from Spring Creek, and its dimensions are:—Height, 3 mm.; diameter of calice, 6·5 mm. Another from the same locality is 4 mm. high, and its calice is 7 mm. in diameter. An example from Table Cape is 8.5 mm., and one from Beaumaris 9 mm. in diameter; both of these are reduced in height by wear. The largest example is from Forsyth's, Grange Burn, and is 5·5 mm. high, and 9 mm. in diameter.

Locality, etc.—Extremely common at Spring Creek and Maude; less so at Table Cape, Beaumaris, and the upper beds of Muddy Creek. Rare in the Mulgundawa bore, near Wellington, South Australia. Its range is, therefore, from Eocene to Miocene.

The specimens from Spring Creek show no trace of adherence, and the base is flat: in those from Beaumaris, Table Cape, and the Muddy Creek Miocene the base is variable, being either flat or convex, and with or without a scar of attachment. The base is usually concave in Maude examples, and seldom shows any central scar. Though somewhat diverse in size, as well as in the outline of the base, the fossil forms agree in essential characters. As already intimated in this volume, they are closely allied to the recent *D. Vincentinus*, mihi. The latter, however, is generally taller and larger, is without tertiary pali, and has a deeper central fossa. Examples of the fossil species from Table Cape, Beaumaris, and Muddy Creek are apparently nearer the recent one than those from Spring Creek and Maude.

Deltocyathus Verconis, *spec. nov.* Pl. xxiv., figs. 2*a*, *b*.

The corallum is minute and discoid in shape. The base is flat with a rounded margin. At its centre there is a scar of former attachment, large for the size of the coral, and either circular or elliptical. There are 48 radiating costæ on the base, of equal size, free, and nearly as stout at their central ends as at the margin. They do not arise from the centre of the base, but only from the borders of the scar of adherence; when this is removed by wearing, as is often the case, the under surface of the columella and of the inner ends of the principal septa are exposed. The surface of the costæ is crenately granulose, the separate granules being large, rounded in the axial line, and bluntly projecting transversely. From the basal margin the costæ rise vertically for a short distance, and then, curving round, are continued as septa.

The calice is circular and only slightly convex. The septa are stout, sub-equal, profusely granular, and, though now mostly flattened by wearing, were originally exsert. They are in six systems with four cycles, and are arranged in the usual deltoid combinations. There are pali before the principal orders, those before the secondaries being the largest. The columella is fascicular and fused with the primary and secondary pali.

Height of corallum, 2·5 mm.: diameter of base, 4·5 mm. There are three coralla of this size in my collection, and the rest are smaller.

Locality, etc.—In Eocene strata at Shelford (amphitheatre section), ten examples: and in the equivalent bed on the Murray River, near Morgan, one example.

I have great pleasure in naming this species after Dr. Jos. C. Verco, whose extensive dredging operations in St. Vincent and Spencer Gulfs have so materially increased our knowledge of the marine fauna of South Australia.

FAMILY OCULINIDÆ.

Genus Oculina.

Oculina umbellata, *spec. nov.* Pl. xxv., fig. 3.

The corallum is composite, compact, and umbel-shaped, with a flat upper surface and rapidly sloping sides. The base is stem-like, and now shows a fractured under surface without visible sign of adherence. Seven large calices are regularly arranged around the upper marign, with their outlines showing also on the sides as mammillated projections. They are unequal in size, irregularly elliptical, and of moderate depth. The costæ rise slightly above the margin of the calices, are continuous with the septa, equal, broad, granulose, and distinct on the upper surface, especially at the calicular margins. From these they recede in curved, tortuous lines, and gradually become less prominent: on the sides of the corallum the costæ are very faintly marked.

The calices are, unfortunately, broken down internally, as if they had been cleared of sediment with a sharp instrument, and their structure cannot therefore be fully determined. There are numerous, close, granular septa, but the number of systems and cycles is not now decipherable. Remnants of granular pali and of a nodular columella are still left in one or two calices. Judging from the well preserved state of the costæ, this unique specimen must have been originally in excellent order.

At its summit the corallum is 35 mm. long and 30 mm. broad. The solid cœnenchyma from the extremity of the base to the centre of the upper surface measures 21 mm.

The diameters of the largest calice are 13 mm. and 10 mm.; and of the smallest, 9 mm. and 8 mm. respectively.

Locality, etc.—From a well-sinking in the Murray Desert. The coral was sent to the late Professor Tate, who, after some trouble, identified the locality as Mindarie, 80 miles south-east of Swan Reach, Murray River. The age of the fossils accompanying it is given in Professor Tate's memoir as Post-Eocene (? Oligocene).*

FAMILY ASTRÆIDÆ.

GENUS PARASMILIA.

Parasmilia Flindersensis, *spec. nov.* Pl. xxiii., figs. 2*a*, *b*.

The corallum is pedicellate, tapering, and curved or twisted. Some examples have occasional warts or excrescences on their surface. The wall is stout and smooth, and rarely shows the remains of a banded epitheca: at the summit only a few costæ appear as continuations of the principal septa. A specimen lately collected has the base of one corallum attached to the calice of another, with its columella and half the septa still free. This, however, is merely a case of accidental adhesion.

The calice is circular and deeply excavated. The columella is large, spongy, and reaches high up in the calice. The septa are sparsely granular, and in ten systems, with three cycles. The primaries are long, stout, and wavy; for a short distance from the margin they are horizontal, and then descend vertically in the fossa, a clear space being left between them and the columella. The secondaries are thinner, less conspicuous, also wavy, and pass into the fossa nearer the margin; the tertiaries are very slender lamellæ. Endotheca scanty; in the type specimen there is apparently none, but it is certainly present in some others.

Height, 14 mm.; diameter of calice, 6 mm.

Locality, etc.—In a small exposure of Eocene limestone at Flinders, Victoria.

Parasmilia lucens, *spec. nov.* Pl. xxiv., figs. 6*a*, *b*, *c*.

The coralla vary both in shape and size. Some are straight and conico-cylindrical, or vase shaped, while others are slightly bent and of nearly the same circumference throughout. Again, there are moderately tall as well as short examples. The pedicellate base is large and is frequently still attached to a fragment of shell. The wall is stout, and is covered by a white, shining epitheca, which

* On some Older Tertiary Fossils of uncertain age from the Murray Desert. R.S.S.A., vol. xxiii.

occasionally has a few warty excrescences on its surface. The costæ are broad, more or less granular, and faintly marked beneath the epitheca. When this is worn off the granules of the costæ become more distinct.

The calice is circular and shallow. The septa are highly granular, and in six systems with four cycles. They are slender, but unequal in size, the two first orders being stouter than the very thin tertiaries and quaternaries. The columella is moderately large, fascicular, and united by lateral processes with the inner ends of the principal septa. A scanty endotheca is present in some of the calices.

The wall of the larger corallum figured has been broken down below the level of the columella, which now projects above it. The total height of the specimen is 20 mm. A smaller bent individual is also somewhat damaged. It is 15 mm. in height, with a calice 7·5 mm. in diameter.

Locality, etc.—In Eocene strata at Brown's Creek, in the Aire River district. Ten examples.

This species differs from *P. Hermani* of the same beds by its large base, and straight or slightly bent instead of horn-shaped corallum. It is distinguished also by its smooth, shining epitheca.

Genus Conosmilia.

Conosmilia granulata, *spec nov.* Pl. xxiv., figs. 5*a*, *b*.

The corallum is curved, horn shaped, circular in transverse sections, inflated superiorly, and then tapering to an almost pointed base; at the extremity of this there is a mark of former adherence. A delicate, finely granular epitheca covers the wall, which is thin in the figured example, but stouter and stronger in a larger one. The latter has a portion of the wall at the calicular margin and some of its septa broken down, while the type is a finely preserved specimen. The costæ are continuous with the septa, equal, slightly projecting at the summit, and prominent or not lower down. They are outlined on the wall by broad, wavy lines of the epithecal granules.

The calice is circular, widely open, and shallow. The septa are granular, slender, and in six systems with four complete cycles. The primaries and secondaries are long, and reach the columella; the tertiaries are slightly and the quaternaries much shorter. The latter are also somewhat thinner than the other orders. The columella is prominent, trabecular, and formed of twisted, vertically placed laminæ, which fuse with the inner ends of the primary and secondary septa The endotheca is scanty.

The dimensions of the type are:—Height of corallum, 17 mm.; diameter of calice, 10 mm. The larger example men-

tioned is 30 mm. in height, and its calice is approximately 15 mm. in diameter.

Locality, etc.—In Eocene strata at Cape Otway. Two examples. A single juvenile example also from Brown's Creek. Collected by Mr. Kitson and myself.

I place this species in Conosmilia on account of its twisted laminate columella. In all other respects it might certainly come under the allied genus, Parasmilia.

Conosmilia stylifera, *spec. nov.* Pl. xxiv., figs. 1*a*, *b*.

The corallum is small, cylindro-conical in shape, of moderate height, or sometimes tall, usually straight, but occasionally curved just above the pedicellate base. The wall is thin near the calice, but becomes stouter below, and is covered by a pellicular epitheca. This is ridged transversely, but otherwise almost plain. With the lens, however, very fine encircling lines and broad longitudinal striæ are traceable on its surface. These striæ mark the mural boundaries of the septa, and thus represent very faint, rudimentary costæ.

The calice is circular and deep centrally. The septa are in six systems and three complete cycles, with occasionally some of a fourth. The primaries, which are stout and long, slope from the margin, and then descend almost vertically in the fossa. For some distance down a clear space is left between them and the columella, but lower still they become fused with it. The remaining orders of septa are much thinner, subequal in size, and of diminishing length according to order. The inner edges of all the septa are more or less waved, and their sides are sparingly granular. The columella is strong, and projects vertically in the fossa as a long pointed style. It is nodular, twisted, broad below, and gradually tapers upwards. Deep down in the fossa it sends out strong lateral processes, which fuse with the primary septa. The endotheca is fairly developed in some examples, but in others is very scanty.

The coralla vary in height from 10 mm. to 17 mm.; the calices are from 4 mm. to 5 mm. in diameter.

Locality, etc.—In Upper Eocene strata at Spring Creek. Eleven examples.

This species is at once distinguished from all other Conosmiliæ by its strong styliform columella and almost plain epitheca.

FAMILY FUNGIDÆ.

Genus Bathyactis.

Bathyactis Beaumariensis, *spec. nov.* Pl. xxiv., figs. 3*a*, *b*.

The corallum is very small, discoid, and free. The base is either flat or slightly concave, and, with the exception of a

narrow rim, is covered with a white, glistening epitheca. The surface is smooth, but lightly raised here and there in small, blister-like swellings. The costæ are stout and prominent on the basal margin of many examples, but in others the edges are merely crenulated by their equal projections. Except at the rim the costæ are usually concealed on the base by the epitheca, but occasionally they are faintly traceable beneath it, and in a single example show as well raised lines almost to the centre. At the margin they rise vertically to the height of the corallum, and then, bending sharply round, continue in the calice as septa. On the basal rim as well as on the perimeter of the corallum they are rounded, very finely dentate at their free edges, and beset laterally by numerous sharply pointed granules.

The calice is circular and flat. There are four cycles of septa and six systems, of which one is often incomplete. The primaries are free, and the remaining orders unite together in deltoid combinations. In a complete system each pair of quaternaries unites with the enclosed tertiary to form single septa of increased size. These, converging towards each other, meet in front of the straight secondary, and fuse with it. A short, stout septum is thus produced, which reaches the columella. In the type calice one system is incomplete, half of it being undeveloped. All the septa are more or less flattened at the surface, and are minutely granular on their sides. The columella is essential, of moderate size, and trabecular. It fuses with the edges of the primary and secondary septa. The margins of the septa are markedly coalescent over the apices of the deltas. The synapticulæ are few, and in many specimens scarcely noticeable. In the figured specimen they are arranged in a concentric circle at about one-fourth from the margin.

The coralla are from 3·5 mm. to 4 mm. in diameter, and from 1 mm. to 1·5 mm. in height.

Locality, etc.—Abundant in the Miocene of the Grange Burn (upper Muddy Creek beds), and in the Oligocene of Beaumaris. The type is from the latter locality.

Bathyactis excelsa, *spec. nov.* Pl. xxiv., figs. 4*a*, *b*.

The corallum is discoid and lens-shaped. Its base is slightly concave or almost flat, and without trace of attachment. The costæ are broad, equal, and continuous with the septa. They dentate the edge of the base by their projections and remain prominent on its surface for a short distance inwards, when they suddenly become much less distinct. Their surface and also the intercostal spaces are covered with a fine granular epitheca.

The calice is circular and convex. The septa are stout, subequal, and in six systems with four cycles, the last three of which form the deltoid combinations usual in the genus. The primaries are free, the tertiaries bend towards and join the secondaries at a fourth from the columella, and the quaternaries again join the tertiaries about halfway from the margin. At their junction with the next higher orders of septa both the tertiaries and secondaries become slightly thicker than before, and rise in the calice as rounded, lamellar, fan-like projections. The raised secondary fans descend vertically in the axial space until they reach the level of the sunken primary septa, when, similarly with these, they unite by thin processes with the columella. The sides of the septa are characteristically marked by inwardly converging rows of sharp, prominent ribs, which project beyond the free septal edges, and strongly dentate them. Sometimes these ribs consist of intermittent lines, and then resemble rows of sharply pointed granules. The columella is strong, lamellar, dentate on its free edge, and in line with two opposite primary septa. There are usually three dentations on its surface, of which the central one rises above the other two.

The synapticulæ are numerous, stout, in four or five concentric lines, and placed between all adjoining septa.

The figured specimen, which is the largest collected, is 13 mm. in diameter. Its height to the summit of the secondary and tertiary fans is 5 mm. The other examples are about 10 mm. in diameter.

Locality, etc.—Fairly common in Eocene strata at Spring Creek, near Geelong. Rare at Fishing Point, Aire River.

This coral is closely allied to *Bathyactis lens*, Duncan,* from which it differs by its larger size, more numerous synapticulæ, and stout lamellar columella. In his original description of *B. (Antillia) lens* Duncan gives it a small essential columella, but when dealing with the same coral under the name of *Montlivaltia discus* Woods states that it is without a columella. I have examined numerous examples of Duncan's and Woods's species, and judge that it has a minute, almost styliform, columella.

FAMILY EUPSAMMIDÆ.

Genus Balanophyllia

Balanophyllia truncata, *spec nov.* Pl. xxv., figs. 4*a*, *b*.

The corallum is simple, short, stout, sub-cylindrical, and abruptly terminated superiorly. The base is broad, flat,

* *Antillia lens*, Duncan. Ann. and Mag. Nat. Hist., 1865. *Montlivaltia discus*, Ten.-Woods. R.S.N.S.W., 1878. *Bathyactis lens*, Dennant. R.S.N.S.W., 1897.

tumid, and usually attached to a fragment of shell or to polyzoa. One example has its base perforated for an annelid, the calcareous tube of which is still left almost intact on its under surface. The wall is stout, and marked by rows of broad, prominent, equal, granular costæ. At the truncated summit of the corallum these festoon the calicular margin, and contrast strongly with the slender septa which form their continuations in the calice. There is a variable amount of epitheca, and it may be either delicate or moderately stout. When worn away, as is frequently the case, a series of irregular, longitudinal pores, separated by thin, transverse bars, become visible in the interspaces of the costæ.

The calice is subplane and slightly elliptical. The ratio of the major and minor axes varies in the examples; in the type it is as 10 to 8. The septa are porous, very thin, minutely granular, and in six systems with four cycles. The tertiaries are the most conspicuous septa in the calice and the two in each system bend towards each other and unite close to the columella. Not unusually these septa describe a double curve, first towards the tertiary of the same system, and then away from it towards the adjoining one in the next system. The quaternaries bend towards and join the tertiaries near the margin; in the loops thus formed the free quinaries appear as very short projections from the wall. The primaries and secondaries are free, subequal, and continue or not to the columella. In the type calice only one system is complete, the rest wanting the two higher orders in one half of each system. A slightly larger but less perfect calice has the higher orders more fully developed. The columella is prominent, fascicular rather than spongy, and longitudinally placed in the fossa.

Height, 14 mm. Length of calice, 5·5 mm.; breadth of do., 4·5 mm.

Locality, etc.—Eocene. Abundant at Spring Creek, and fairly common at Cape Otway, Wilkinson's No. 4, and Fishing Point. Single examples from the clays of Calder River, a tributary of the Aire, and from Shelford.

Balanophyllia induta, *spec. nov.* Pl. xxv., figs. 1*a*, *b*.

The corallum is tall, slender, straight or slightly bent, and either subcylindrical or regularly tapering. The base is flat and pedicellate. The pedicel is of moderate size, and sometimes quite small. The wall is stout, and covered by a thin pellicular epitheca. This is marked transversely with fine chevroned lines arranged in a series of narrow, scarcely raised, encircling bands. Such an ornament is unusual in Balanophylliæ, and resembles that seen in some species of Fla-

bellum. The specimens are often much worn, and the epitheca then becomes almost or quite smooth. The costæ are very faintly marked as parallel lines beneath the epitheca.

The calice is shallow and either circular or just elliptical. The septa are slender, minutely porous, and sparingly granular. They are in six systems with four cycles, which are arranged on the same plan as those of the species just described. The calice illustrated belongs to the tallest example collected, and has only two of its systems complete; in two others the higher orders are partially developed, while in the remaining two they are wholly wanting. The columella is moderate in size, spongy, and longitudinally placed.

Diameters of calice, 7 mm. and 6·5 mm. Height of corallum figured, 17 mm. The tall individual mentioned has a height of 25 mm., but though its calice is well preserved, the epitheca is much worn, and in places entirely removed, the porous wall beneath being thus exposed.

Locality, etc.—Eocene. Spring Creek, near Geelong, 13 examples; Cape Otway, 2 examples; Wilkinson's No. 4, 1 example. Those from the two last mentioned localities and one from Spring Creek are much smaller than the rest.

This species is distinguished from the preceding by its complete epitheca. It is also of more slender habit.

Balanophyllia fossata, *spec. nov.* Pl. xxv., figs. 2*a*, *b*.

The corallum is moderately long, curved, conico-cylindrical, and regularly tapering to a small pedicellate base. The wall is porous, granular, and stout. It is encircled by a partial epitheca, which is banded and occasionally raised in growth ridges. Towards the base the epitheca is stronger and more persistent than in the superior portions of the corallum. The costæ are either faintly marked, or, as in the type, barely traceable on the wall.

The calice is slightly elliptical, very deep, and has a broad margin. At the bottom of the central fossa, which in the well preserved calice figured is narrow as well as deep, a small, delicate, spongy, and longitudinally placed columella is just perceptible. The septa are minutely granular, and in six systems with four cycles. All are slender, but the primaries, secondaries, and also the tertiaries below their junction with the higher orders are rather stouter than the rest. The higher orders are absent in one half-system of the type calice, but are otherwise regularly developed. They slope rapidly downwards, and, bending towards the tertiaries, join them at about one-third from the margin. Below this junction the tertiaries increase in size, and, passing beyond the first two orders, descend abruptly in the fossa.

There is no other union of septa in the calice, the primaries and secondaries being straight and free. The edges of both these orders slope gradually for a short distance from the wall, and then, like the tertiaries, they descend vertically in the fossa. They do so, however, much nearer the margin, and thus at a comparatively high level in the calice.

Height of corallum, 21 mm.; length of calice, 10·5 mm.; breadth of do., 9 mm.

Locality, etc.—Very rare in the Eocene strata of Cape Otway. Two examples.

This species is allied to *B. tubuliformis*, Duncan, from which it is distinguished by its banded epitheca, slender septa, elliptical calice, and curved outline.

Balanophyllia patula, *spec. nov.* Pl. xxv., figs. 6*a*, *b*.

The corallum is straight, subturbinate, slightly compressed, moderately tall, broad at the summit, and then tapering to a tumid pedicellate base. The whole surface is vermiculate and granular, the granules being most prominent on the broad, equal, raised costæ. These project at the summit, and slightly overlap the calicular margin, where their correspondence with the septa is well marked. The wall is highly porous, and so thin as to appear translucent when viewed against the light. There is no epitheca.

The calice has a vermiculate margin, is shallow, widely open, and subelliptical. The septa are slender, porous, granular, and occasionally spined. They are in six systems, with four complete cycles. The tertiaries are by far the most conspicuous septa in the calice. For about one-half from the wall they are small and thin, when they are joined by the higher orders, which curve towards them. At this junction, or a little above it, they rise as large, stoutish, very prominent fans, with spined and jagged edges, and continue to the columella. There are thus twelve tertiary fans in the calice, of which the eight opposite the sides are larger than the four at the ends. The two fan-like tertiary septa in each system curve round at their inner ends and unite in front of the enclosed straight secondary, which, though usually free, sometimes continues to the apex of the curve.

The primaries are straight, free, and reach the columella. This is spongy, of moderate size, and placed in line with the major axis of the calice.

Some endotheca occurs between septa, chiefly near the margin and at the columella.

Height, 23 mm. Diameters of calice, 14 mm. and 12 mm.

Locality, etc.—This elegant coral is represented in my collection by a single, perfect specimen, which was found in

the Eocene exposure at Red Bluff, Shelford. It is distinguished from other Australian Balanophylliæ by its widely open calice, prominent and equal costæ, as well as by the raised fan-like extensions of the tertiary septa.

Balanophyllia torta, *spec. nov.* Pl. xxv., figs. 5*a*, *b*.

The corallum is free, cylindro-conical, curved, and twisted. It tapers gradually at first, and then more rapidly to the base, which terminates in a bluntly rounded point. There is no trace of adherence. Strictly speaking, therefore, it might be placed under Eupsammia, but as it has the habit of Balanophyllia I retain it in that genus.

The wall is cellular, thin at the calicular margin, but stouter below. An epitheca of delicate texture covers it here and there in irregular bands or patches. The costæ are broad, equal, granular, and traceable on the wall from the summit to the base of the corallum. Where the epitheca is wanting they consist of raised, prominent ridges.

The calice is deep, slightly elliptical, and has an irregular, cellular margin. In the example figured it is contracted on one side by an inbending and consequent overlapping of the wall. The septa are moderately stout, porous, highly granular, and in six systems with four cycles. The primaries are straight and free; the secondaries are either free or join one of the tertiaries near the columella. The tertiaries are very prominent, are joined by the higher orders at about one-fourth from the wall, and then continue to the columella. Above this junction they form with the quaternaries a series of twelve intra-mural loops, with a small, straight quinary in the centre of each.

The columella is of moderate size, spongy, long, and at the bottom of the deep, central fossa. As the wall surrounding the calice is very thin, it is frequently broken down even below the level of the columella, which then projects in the calice, instead of, as in perfect specimens, just showing at the base of the fossa. It is easy to understand that a specific determination based on such worn material might be altogether erroneous.

Height of corallum, 25 mm.; length of calice, 11 mm.; breadth of calice, 9 mm. A taller specimen has a height of 31 mm., but its wall is broken down in the manner described. Originally it must have been at least 36 mm. in height.

Locality, etc.—In Eocene strata at Cape Otway and Wilkinson's No. 4 locality. Four large examples and seven smaller ones.

The only species likely to be mistaken for *B. torta* is *B. Ulrichi*, Duncan, which is very abundant in the same beds.

The latter can, however, be at once distinguished by the small pedicel at the end of the narrow base.

When dealing with the Australian Balanophylliæ, Duncan identified a species found at Cape Otway with *B. cylindrica*, Michelotti, from Turin and Verona.* In 1895 I entrusted the late Professor Tate, who was visiting Europe, with selected examples from my collection of Australian tertiary Balanophylliæ, for comparison with Duncan's types. He identified all the examples except *B. cylindrica*, and marked my supposed equivalent as "very doubtful." In one respect only, viz., its pointed base, does *B. torta* agree with Duncan's figures and description of *B. cylindrica*, but its calice is quite dissimilar, being deep, and superficially contracted instead of shallow and widely open. Either Duncan obtained specimens which are not represented in my collection, or, what is far more likely, he had before him immature, broken specimens of *B. torta*, or of some species allied to it.

A figure and description of *Balanophyllia (Turbinolia) cylindrica*, Michel. are given by Michelin†, and in remarking upon the species he says:—"Cette espèce est remarquable par sa forme très allongée et cylindrique, ses lamelles et ses stries égales, et sa base presque toujours brisée, paraissant avoir été adhérente." This description is certainly not applicable to *B. torta*, while the figure accompanying it is unlike any Balanophyllia that I have seen from the Otway beds.

Balanophyllia cauliculata, *spec. nov.* Pl. xxv., figs. 8*a*, *b*.

The corallum is in outline a cylinder supported upon a long, narrow, and slightly oblique stem. It may be compared to a miniature wineglass with its foot removed. There is a small pedicel at the extremity of the stalk-like base. The wall is cellular and minutely granular. A dense, banded epitheca, with fine encircling lines, covers the stem, and a broad band of a finer textured epitheca surrounds a constriction of the wall just below the calicular margin. The costæ are equal, broad, and correspond with the septa; above the epithecal band near the summit of the corallum they are prominent and highly cellular, but below this they are only faintly traceable on the wall.

The calice is deep and subelliptical, its major and minor axes being in the ratio of 100 to 87. Its margin is narrow and very cellular. The septa are delicate, cellular, porous near the wall, and finely granular. They are in six systems with four cycles. The primaries and secondaries are

* Q.J.G.S. Vol. xxvi., p. 304, pl. xxi., fig. 7.
† Icon. Zooph. p. 38, pl. viii., fig. 15.

straight, free, and rather stouter than the rest. The tertiaries are thin, spined, and wavy at their free edges, and are joined by the higher orders, which have also irregular, spined edges, about midway from the wall. The interior of the calice, with its slender, cellular, and wavy septa, may be compared to an extremely fine lace pattern. The tertiaries in each system bend towards each other, and meet or not near the columella. In one half-system the fourth cycle of septa is wanting, and its tertiary remains straight and free almost to the columella, when it curves round and unites with the other tertiary in the same system. The columella is small, fascicular, and consists of a few twisted, rod-like processes, which are longitudinally placed at the bottom of the fossa. Superficially it is free, but deeper down it is joined by the principal septa.

The height of the corallum is 15 mm., the cylindrical portion being 9 mm., and the terminal stem 6 mm. in length. The calice is 8 mm. long and 7 mm. broad.

Locality, etc.—Very rare at Cape Otway and at Wilkinson's No. 4, adjoining beds in the Aire River district. One example from each locality.

This elegant little coral may be at once distinguished from its congeners in the same beds by its delicate, finely granular wall. Its nearest ally is *B. campanulata*, Duncan, which is also restricted to the beds mentioned. The latter, however, has a large, spongy columella, more prominent costæ, and much stouter septa.

Balanophyllia Basedowi, *spec. nov.* Pl. xxv., figs. 7*a*, *b*.

The corallum is very low, cylindrical, and attached by a broad, spreading base to shells or polyzoa. There is a distinct, perpendicular, stout, but very short wall. This is porous, and marked by broad, raised, granular costæ. Some epitheca exists; in the type it is confined to the outer portion of the spreading base.

The calice is circular, almost flat, and has a wide, porous margin. The septa are also porous, but not granular. They are in six systems with three cycles. The tertiaries curve round and join the secondaries about halfway from the margin, and these again unite with the primaries at the columella. The fourth order, when present, joins the primaries quite close to the wall. The columella is small, and consists of a few fascicular processes, which unite with the primary and secondary septa.

Height, 2 mm.; diameter of calice, 4·5 mm.

Locality, etc.—Eocene. The three examples of this coral are from widely separated localities. Two of them, viz., the type, from the Murray River, near Morgan, and another

from Spring Creek, are attached to polyzoa; while the third, from Cape Otway, is fixed to the tube of *Dentalium Mantelli*.

I dedicate this interesting coral to the late Hon. Friedrich Basedow, in remembrance of the great interest taken by him in the natural history of the State.

I have now dealt with nearly all the undescribed corals in my collection. The few remaining are represented by single and mostly imperfect examples, and their consideration must be postponed till fresh material comes to hand. Some general remarks upon the distribution, affinities, etc., of Australian tertiary corals will be made in a succeeding article, which is in course of preparation.

EXPLANATION OF PLATES.

Plate XXII.

Fig.
1. *Flabellum microscriptum*—corallum, natural size.
2. *Flabellum medioplicatum*—corallum, natural size.
3. *Flabellum Grangense*—corallum, magnified 1·5 diam.
4. *Placotrochus magnus*—*a*, corallum of deltoid example, natural size; *b*, corallum of cuneiform example, natural size; *c*, calice of the latter, magnified 1·5 diam.
5. *Ceratotrochus Australiensis*—*a*, corallum, magnified 2 diam.; *b*, calice of same, with endothecal ring, magnified 6 diam.
6. *Platytrochus Maudensis*—*a*, corallum, magnified 4 diam.; *b*, calice of another example, magnified 10 diam.
7. *Discotrochus ? pateriformis*—*a*, corallum, magnified 6 diam; *b*, calice of same, magnified 8 diam.

Plate XXIII.

1. *Deltocyathus stellaris*—*a*, corallum, magnified 3 diam.; *b*, calice of same, magnified 3 diam.; *c*, base of same, magnified 3 diam.
2. *Parasmilia Flindersensis*—*a*, corallum, magnified 2 diam.; *b*, calice of same, magnified 4 diam.
3. *Leptocyathus ? convexus*—*a*, corallum, magnified 4 diam.; *b*, calice of same, magnified 8 diam.
4. *Trochocyathus Wilkinsoni*—*a*, corallum, magnified 2 diam.; *b*, calice of the same, showing two systems of septa, magnified 6 diam.
5. *Deltocyathus fontinalis*—*a*, corallum magnified 4 diam.; *b*, calice of same, magnified 4 diam.

Plate XXIV.

1. *Conosmilia stylifera*—*a*, corallum, magnified 2 diam.; *b*, calice of same, magnified 5 diam.
2. *Deltocyathus Verconis*—*a*, calice, magnified 6 diam.; *b*, base of another example, magnified 6 diam.
3. *Bathyactis Beaumariensis*—*a*, calice, magnified 6 diam.; *b*, base of slightly smaller specimen, magnified 6 diam.
4. *Bathyactis excelsa*—*a*, corallum, magnified 1·5 diam.; *b*, calice of the same, magnified 2·5 diam.

5. *Conosmilia granulata*—*a*, corallum, magnified 2 diam.; *b*, calice of the same, magnified 3 diam.
6. *Parasmilia lucens*—*a*, a straight corallum, magnified 1·5 diam.; *b*, a bent corallum, magnified 1·5 diam.; *c*, calice of the latter, magnified 4 diam.

Plate XXV.

1. *Balanophyllia induta*—*a*, corallum, magnified 1·5 diam.; *b*, calice of a longer individual, magnified 4 diam.
2. *Balanophyllia fossata*—*a*, corallum, magnified 1·5 diam.; *b*, calice of the same, magnified 3·5 diam.
3 *Oculina umbellata*—corallum, natural size.
4. *Balanophyllia truncata*—*a*, corallum, magnified 1·5 diam.; *b*, calice of another example, magnified 6 diam.
5. *Balanophyllia torta*—*a*, corallum, natural size; *b*, calice of same, showing three systems of septa, magnified 3·5 diam.
6. *Balanophyllia patula*—*a*, corallum, natural size; *b*, calice of same, showing three systems of septa, magnified 3 diam.
7. *Balanophyllia Basedowi*—a, corallum fixed on a polyzoon, natural size; *b*, calice of same, magnified 6 diam.
8. *Balanophyllia cauliculata*—*a*, corallum magnified 2 diam.; *b*, portion of calice of same, magnified 6 diam.

DESCRIPTIONS OF AUSTRALIAN CURCULIONIDÆ, WITH NOTES ON PREVIOUSLY DESCRIBED SPECIES.

By ARTHUR M. LEA.

PART II.*

[Read October 27, 1903.]

SUB-FAMILY BRACHYDERIDES.

EVAS ELLIPTICA, n. sp.

Densely clothed with small, round scales, entirely concealing the colour of the derm, those on the upper surface more or less metallic coppery; sides, from apex of rostrum, almost (or quite) to apex of elytra, and the under surface, with white scales, with a silvery (sometimes with a faint purplish or coppery) gloss; legs with scales as on upper surface, more or less mingled with white; base of femora with white scales. Eyes completely and narrowly ringed with white scales. In addition to the scales, clothed with stout, erect, white setæ; tibiæ fringed beneath with long, thin hair.

Head with a narrow, longitudinal impression between eyes. Rostrum transversely impressed on each side at base, with a feeble median carina. *Prothorax* (by measurement) slightly longer than wide, but apparently the reverse, sides gently rounded, apex very slightly narrower than base; with large, round, shallow punctures, distinctly traceable through clothing; without ocular lobes. *Elytra* elliptic-ovate, apex notched, at base no wider than prothorax, shoulders absent, widest at about one-third from base; seriate-punctate, punctures moderately large and subquadrate, moderately distinct through clothing; interstices not or scarcely visibly raised. All the *tibiæ* with small and acute teeth, but those of the posterior scarcely noticeable. Length 6⅓, width 2⅓ mm.

Hab.—W.A.: Darling Ranges.

The shape is very different to that of the other Western Australian species. The white scales at the sides of the elytra do not usually touch the extreme margins; the eyes have a spectacled appearance. On one specimen the prothoracic scales have a decided greenish gloss. The elytral setæ are placed in regular single rows: seen from in front or from above they appear decidedly white and in rather strong contrast to the scales: from the sides or behind they appear to be almost black, and are much less distinct.

* Part I. was published in Vol. xxiii., p. 137.

EVAS LATIPENNIS, n. sp.

Densely clothed with small round scales, entirely concealing the colour of the derm; scales of upper surface more or less slaty brown, with a slight coppery gloss; sides, under surface, and legs with silvery-white scales; prothorax with two very distinct stripes of white scales, and which are feebly continued on to head and elytra; apex of elytra with white scales, and which are more or less feebly continued along interstices. Elytra with moderately stout, depressed setæ, visible from in front, above, or the sides, but invisible from behind; prothoracic setæ visible only from the sides.

Head wide, feebly longitudinally impressed between eyes. Rostrum short, shallowly longitudinally bisulcate. *Prothorax* subcylindrical; in male noticeably, in female scarcely, transverse; longitudinally impressed in middle; with small rounded granules; without ocular lobes. *Elytra* raised above and fully twice the width of prothorax, base on each side slightly oblique, shoulders subtuberculate; striate-punctate, punctures round and rather shallow, moderately distinct through clothing; interstices gently but distinctly convex and usually wider than punctures; apex feebly notched. Four anterior *tibiæ* with small and acute teeth. Length 8, width 3 mm.

Hab.—W.A.: Darling Ranges.

The elytra are proportionately wider and much more distinctly elevated above the prothorax than in the other species with which I am acquainted. The shoulders are slightly less square than in the male of *acuminata*. The brownish scales on the elytra cover less than half the surface, and are more distinct near the base, between the shoulders, and on the seventh interstice, than elsewhere; in one specimen the white scales are feebly tinged with pink.

EVAS, sp.

I have a remarkable specimen of this genus belonging either to *acuminata* or to an undescribed species. It appears to be hermaphrodite, having the left side female and the right side male. The left elytron is rounded and not at all produced at the shoulder, being there scarcely wider than the prothorax; the right, on the contrary, having the shoulder produced and tuberculiform, and much wider than the prothorax; it is also wider throughout and fully half a millimetre longer than the other, and is more abundantly supplied with white scales. The right anterior tibia is slightly longer, more noticeably curved, and with slightly stronger teeth than the left.

EVADODES RUGICEPS, n. sp.

Densely clothed with muddy brown or grey scales, scarcely paler on flanks of prothorax and under surface than above. In addition with dingy whitish setæ.

Head longitudinally wrinkled between eyes; these small and very prominent. Rostrum with a very feeble carina along middle, depressed on each side; sides above scrobes almost parallel. *Prothorax* rather strongly transverse, disc somewhat uneven, with a narrowly excavated median line, apex feebly produced; ocular lobes distinct. *Elytra* much wider than prothorax, widest about middle, thence rather suddenly arcuate to apex; apex feebly notched; striate-punctate, punctures moderately large, subquadrate, partially concealed by clothing; interstices scarcely visibly (except at base) alternately raised. Four anterior *tibiæ* with small, acute teeth. Length 8, width 3⅓; variation in length, 6-8¼ mm.

Hab.—N.S.W.: Forest Reefs.

Apparently much closer to *decorum** than *lineatus;* from the description of the former it differs by its clothing and shoulders; from the latter (specimens of which I have from Gayndah) by being very much wider, differently clothed, and with more distinct ocular lobes. Of five specimens under examination none is distinctly marked; they all appear to have been covered with an ochreous exudation, which is, perhaps, entirely responsible for their dingy appearance, as in four of them four feeble, whitish, longitudinal stripes are traceable on the prothorax, and the sides, from head to apex of elytra, appear to be clothed with whitish scales.

PROSAYLEUS PHYTOLYMUS, Olliff.

This species belongs either to *Eutinophæa* or to *Maleuterpes.* I have two female specimens under examination and which have the anterior coxæ separated. Mr. Olliff describes the anterior tibiæ as possessing a spine, but makes no mention of a femoral spine, which could hardly have been overlooked if present.

MALEUTERPES SPINIPES, Blackb.

It is curious the strong superficial resemblance both of male and female that this species bears in miniature to the Tasmanian *Prostomus scutellaris.*

EUTINOPHÆA DISPAR, n. sp.

Brownish-red, legs and antennæ paler. Densely clothed with pale greyish-white scales more or less mottled with pale

* As in *decorum*, there is a strong resemblance to Mr. Pascoe's figure of *Ochrometa amœna.*

brown along middle of prothorax and elytra. Each prothoracic puncture with a seta not rising to the general level; each interstice of elytra with a regular (but very indistinct) row of setæ; under surface with slightly recurved setæ.

Head densely punctate, punctures themselves concealed, but traceable through clothing. Sides of rostrum between antennæ inwardly oblique to base. Funicle with first joint much stouter than and as long as second and third combined. *Prothorax* as long as or slightly longer than wide, sides moderately rounded and slightly the widest at about one-third from base, with crowded, moderately large, and deep punctures, each of which is traceable through clothing. *Scutellum* distinct. *Elytra* distinctly wider than prothorax, base truncate, sides scarcely visibly increasing in width to apical third; punctate-striate, striæ deep, but only moderately traceable through clothing, the punctures entirely concealed; interstices regular, flattened. Anterior coxæ separated;* tibiæ dilating to apex, the anterior straight above and feebly bisinuate beneath. Length, male 1½, female 2½ mm.

Hab.—Sydney.

Apparently close to *nana* (from S. Australia), but the clothing of that species apears to be uniform, whilst of the hundreds of specimens I have seen of this weevil the prothorax and elytra, especially in the males, are distinctly mottled. The colour of the derm can only be seen after the scales have been abraded. The size is remarkably constant I have not been able to find the least variation in size in the males, and the variation in the females is scarcely one-sixth of a millimetre. The species may be obtained abundantly in spring on the flowers of *Eriostemon lanceolatus*.

EUTINOPHÆA FALCATA, n. sp.

Colour varying from a pale to a dark brownish red; legs and antennæ pale red. Moderately densely clothed with pale yellowish scales, the elytra variegated in middle and towards base with chocolate-brown scales; under surface with pale scales, usually with a greenish tinge. Prothorax with small setæ in punctures scarcely rising to the general level; elytra with stout, depressed setæ.

Head not very densely punctate, punctures not very distinct through clothing. Eyes very prominent. Sides of rostrum between antennæ strongly and inwardly oblique to base. Funicle with first joint considerably stouter than

* Mr. Blackburn, P.L.S., N.S.W., 1893, p. 255, notes the anterior coxæ of *E. nana* as being contiguous, a character not mentioned by Mr. Pascoe.

but noticeably shorter than second. *Prothorax* as long or almost as long as wide, subcylindrical, widest at one-third from apex; densely and rather strongly punctate, the punctures irregularly concealed by the clothing. *Scutellum* small and distinct. *Elytra* much wider than prothorax, shoulders slightly rounded, sides subparallel towards apex; striate-punctate, punctures large, suboblong, close together, moderately distinct through clothing; suture, third and fifth interstices raised about summit of posterior declivity. Anterior coxæ separated; anterior tibiæ longer than the others (which are almost straight), and strongly arcuate; claws separated only at apex. Length, 3 mm.

Hab.—N.Q.: Barron Falls (A. Koebele).

To the naked eye each elytron frequently appears to be supplied with two elongate white spots: one before and one behind the middle, sometimes only the posterior ones can be noticed. These spots are on the third (partly on the second) interstice, and become indistinct under a lens. Of thirteen specimens under examination I cannot find the least structural difference, but some which are more brightly clothed and with more distinct marks are probably the males. The scrobe when seen from the side looks somewhat like the letter T and completely isolates a squamose portion of the sides of the rostrum towards the apex. I have not considered it necessary to generically separate it, from *nana* and the preceding, on account of its falcate anterior tibiæ.

Rhadinosomus Lacordairei, Pasc.

This species (a beautiful figure of which has been given * by Mr. Waterhouse, from a specimen collected by Mr. Darwin near Sydney) is very variable in regard to colour, size, and the acuminated portion of the elytra (also sexually variable). *R. impressus* is but a feeble and not at all constant geographical variety; I have specimens from Swan River, W.A., and Tamworth, N.S.W., in which not the slightest difference can be found. In appearance *R. Tasmanicus* is very distinct, but I believe it to be a variety only. Of *R. frater* Mr. Blackburn says:—"This species is distinguished from all the previously described Australian *Rhadinosomi* by its head gradually narrowed from the eyes hindward." This is characteristic of the male of *R. Lacordairei*, judging by numerous specimens taken *in copula*. I have a variety from Mounts Kosciusko and Wellington, in which the colour is much paler than usual and which has the elytra unusually dilated in the female; its head also is rather densely clothed with black setæ.

* Trans. Ent. Soc., vol. ii., pl. xvii. fig. 2.

EUTHYPHASIS ACUTA, Pasc.

This species is recorded by Mr. Pascoe as coming from the Swan River. I have the species from Tasmania, and am inclined to think Mr. Pascoe's locality is erroneous. Mr. A. Simson informs me that about a year before the species was described he had sent a number of Tasmanian weevils (including this species—his number 3,216) to Mr. Fry, from whom Mr. Pascoe probably received his types. The species is distinct, and my specimens agree perfectly with Mr. Pascoe's figure, as well as with the specific and generic diagnoses.

EUTHYPHASIS SORDIDATA, n. sp.

Piceous; elytra piceous-brown, legs and antennæ dull red. Upper surface almost uniformly clothed with dingy-grey scales, a feeble pale line on each side of prothorax; under surface with whitish scales. Elytra with rather long setæ on the sides, at and near apex.

Head with the sides lightly rounded, densely punctate; eyes small, round, placed midway between base of head and apex of rostrum. Rostrum narrower than head: scrobes deep and oblique. Antennæ not extending to elytra; scape somewhat curved; first joint of funicle longer than two following combined; club somewhat elliptic. *Prothorax* slightly shorter than head and rostrum combined, noticeably longer than wide, base slightly wider than apex: median groove very feeble, punctures as on head and rostrum. *Elytra* subelliptic, regularly convex, about once and one-third longer than the rest of the body, wider than prothorax: each obsoletely produced at apex: shoulders oblique; seriate-punctate, punctures rather large and subapproximate; interstices feebly raised and regular. Under surface punctured as prothorax. Legs moderately long: femora somewhat thickened, the posterior extending almost to apex of second abdominal segment: anterior tibiæ bisinuate beneath: claw joint long. Length 3½, width ¾ (vix.) mm.

Hab.—N.S.W.: Forest Reefs.

EUTHYPHASIS LINEATA, n. sp.

Reddish-brown; legs and antennæ dull red. Upper surface with greyish or yellowish-white scales, almost uniform on head, forming feeble lines on elytra, and three moderately distinct lines on prothorax, the median being rather less distinct than the lateral. Under surface (except of head) rather densely clothed with white or whitish scales. Apex of elytra with short setæ.

Head, rostrum, *prothorax*, *under surface*, and *legs* as in the preceding species. Club of antennæ considerably longer than in the preceding. *Elytra* about once and one-half the length of the rest of the body; sides, from behind shoulders (which are oblique) to apical fourth, perfectly parallel; apex distinctly triangularly emarginate; seriate-punctate, punctures comparatively small and round; interstices regular, flat, considerably wider than punctures. Length 4½, width ¾ mm.

Hab.—W.A.: Geraldton.

OPHTHALMORYCHUS SPONGIOSUS, n. sp.

Reddish-brown; muzzle black, antennæ reddish-piceous. Densely squamose; scales of under surface and elytra of a dingy white, the latter with feeble spots of darker scales and with a moderately distinct spot on each side about apical third: prothorax and head with ferruginous-brown scales, the sides and median line whitish: rostrum very densely clothed with ferruginous-brown scales, having a very loose, spongiose appearance, which is caused by numerous small punctiform impressions (from each of which a seta arises); the scrobes in consequence appear to be very deeply sunk.

Head the length of prothorax, cylindrical, parallel-sided; densely punctate, punctures partially concealed; a triangular projection directed upwards and forwards over each eye and causing them to appear somewhat reniform. Rostrum somewhat longer than head, swollen about its middle, where it is wider than head: with a distinct longitudinal impression commencing just behind muzzle, and continued, but feeble, on head. Antennæ scarcely passing prothorax; scape short, deeply immersed in scrobe: funicle with subequal joints: club elongate-elliptic. *Prothorax* slightly longer than wide, base much wider than apex, sides rounded; densely punctate: median line appearing as a shallow groove. *Elytra* slightly more than half the total length, elongate, and somewhat elliptic: shoulders rounded, base on each side lightly raised: each produced at apex: seriate-punctate, punctures large, quadrate, approximate: third, fifth, and seventh interstices raised and thickened. *Metasternum* with a median depression, and which is continued on abdomen. *Legs* rather thin: posterior femora terminating at about the middle of third abdominal segment: tibiæ bisinuate beneath: claw joint long, claws feebly separated. Length 6½, width 1 mm.

Hab.—N.S.W.: Windsor (in flood debris).

This species might very well have been referred to *Euthyphasis*, but as Mr. Blackburn has erected the genus *Ophthal-*

morychus to receive a species having a peculiar process over each eye, processes reproduced in the present species, I have thought it best to refer it to the latter genus. The two genera are closely allied, and in common have many of the characters of *Rhadinosomus*. The above species must be very distinct from *O. angustus*, for, besides being considerably larger, its elytra are not conjointly rounded, the rostrum is wider in the middle than at its base or apex, and its clothing (slightly similar on the flanks of the prothorax) is most remarkable; the prothorax is longer than wide, and not bisulcate. Of *O. angustus* Mr. Blackburn says it has the rostrum "dilating greatly forward from its base in such fashion as to bear a certain resemblance to a funnel, the wide end of which is the apex of the rostrum." This is also true of the above species, but only in regard to its *under* surface.

Besides the specimens described I have two others under examination, in neither of which are the scales so distinctly coloured, being almost uniformly dingy grey, the scales on each side of the median line of the prothorax and on the rostrum being of a pale brown. In all three, however, the character of the scales on the rostrum is the same.

OPHTHALMORYCHUS (METHYPORA) PARALLELUS, Lea.

At the time that this species was described I had not critically examined many weevils, and in consequence was easily led astray by its superficial resemblance to *Methypora postica*. The species, in fact, is very distinct from *Methypora*, having the remarkable lateral extension over each eye characteristic of *Ophthalmorychus;* although possibly a new genus will ultimately be required to receive it.* From the preceding species it differs (besides in many minor details) in having a much more parallel outline, the prothorax considerably longer than wide, and fully as long as head and prothorax combined, antennæ scarcely extending to anterior coxæ, and the legs very decidedly shorter and stouter.

HOMŒTRACHELUS HADROMERUS, n. sp.

Black; legs and antennæ red, club and claws brown. Densely clothed with rather stout, feebly glistening scales.

Head and rostrum feebly convex, the former with a very narrow impression between eyes. Rostrum very indistinctly depressed along middle. Scape about the length of two basal joints of funicle: of these the first is stouter and slightly longer than second. *Prothorax* transverse, base almost truncate, sides moderately rounded; densely and coarsely punc-

* There are at least three other species in the Macleay Museum having these peculiar processes, all of which appear to be undescribed.

tate, punctures almost concealed. *Scutellum* subtriangular. *Elytra* much wider than prothorax, feebly increasing in width to near apex, each strongly rounded at base; seriate-punctate, punctures rather large and subquadrate, appearing to be rather small and oblong when seen through clothing. *Femora* thick, scarcely clavate, edentate; tibiæ stout, with numerous small teeth. Length, male, 3⅔ (rost. incl.), width, 1⅓; female, 4½ x 2 mm.

Hab.—W.A.: Geraldton (Hooper and Lea), Garden Island (Lea).

The small teeth on the tibiæ are more pronounced on the anterior pair, but on all they are frequently entirely concealed. The prothorax at first sight appears to be strongly bisinuate at the base. The colour of the scales appears to be scarcely the same in any two individuals; those of the under surface are more or less grey, in the male usually with a bluish, in the female usually with a greenish tinge, sometimes they are dead white. On the supper surface of the female the prevailing colour appears to be either a sober grey or green variegated with obscure gold; on the male the scales are also frequently grey, but are usually of a russet or golden brown; in many specimens of both sexes, however, the scales are of a dingy black.

SUB-FAMILY OTIORHYNCHIDES.

MYLLOCERUS CARINATUS, n. sp.

Black; legs and antennæ reddish. Densely and uniformly clothed with pale green scales; a few small brown spots on the elytra. Muzzle with long setæ; prothorax with numerous stout setæ not rising above general level; elytra with two or three irregular rows on each interstice, but very dense on suture; under surface and legs with much finer setæ than on upper.

Head flat; a narrow impression between eyes, which is connected with apical triangle by a narrow shining carina. Curvature of scape more pronounced near base than near apex; two basal joints of funicle elongate, the first slightly longer than second, seventh longer than sixth. *Prothorax* widely transverse, base strongly bisinuate, sides very feebly rounded; rather coarsely punctate, the punctures almost concealed. *Scutellum* transverse. *Elytra* about once and one-fourth the width of prothorax, very feebly increasing in width to beyond the middle; striate-punctate, punctures round and moderately large, but appearing to be small and oblong through clothing. *Femora* clavate, feebly dentate. Length, 8⅓ (rost. incl.); width, 2¾; variation in length, 6-8½ mm.

Hab.—N.W. Australia (Macleay Museum), King's Sound (W. W. Froggatt).

On the smaller specimens the spots of brown scales on the elytra are more pronounced; in none, however, do they encroach on the sides or suture. The stout setæ are of a pale yellow colour, and in some lights cause the upper surface (especially of the elytra) to appear to be of a pale golden green.

MYLLOCERUS USITATUS, n. sp.

Black; densely clothed with pale greenish-grey scales; the elytra with small brown spots marking many of the punctures; head and prothorax with numerous blackish specks. Elytra with rather numerous, but scarcely traceable, yellowish setæ.

Head almost flat between eyes. Rostrum with three feeble ridges, all of which are sometimes concealed, and of which the median one is less pronounced. Scape long, rather suddenly curved in middle; two basal joints of funicle elongate, the first noticeably longer than second. *Prothorax* moderately transverse, base rather strongly bisinuate, sides moderately rounded, with strong, concealed punctures. *Scutellum* as long as wide. *Elytra* much wider than prothorax, gently increasing in width to near apex; striate-punctate, punctures rather small, subquadrate, approximate, almost or quite concealed. *Femora* clavate, edentate. Length, 5½; width, 2 mm.

Hab.—N.S.W.: Whitton.

The greenish tinge is more pronounced at the sides and on the under surface; on one specimen many of the scales are decidedly golden.

M. CINERASCENS, Pasc. *Hab.*—Geraldton.

M. DARWINI, Blackb. (co-type).

TITINIA BREVICOLLIS, Blackb.

Mr. Blackburn describes this species from "W. Australia." I have it from Geraldton and Garden Island; at both places it is common on a species of acacia. The elytral spots of pale scales vary from a dull, dead white to a pale green; sometimes the spots are entirely absent; in the female there is seldom a trace of golden lustre; in males in which the golden spots are very pronounced the legs are usually clothed with golden scales. The species is extremely close to *T. tenuis*.

PROXYRUS LECIDEOSUS, Pasc.

An abundant and somewhat variable species. I have it from Geraldton, Dongarra, and Beverley.

MATESIA, n. gen.

Head small. *Eyes* elliptic, rather coarsely faceted, almost touching, as much on rostrum as on head, and not interrupting the general outline of the former. *Rostrum* long and rather thin, basal three-fourths cylindrical, apex bent and narrowed; scrobes short, deep, subapical, a scarcely traceable depression on each side connecting them with eyes. *Antennæ* slender; scape considerably passing eyes; funicle with all the joints elongate; club elliptic, distinctly jointed. *Prothorax* subconical, base strongly bisinuate, without ocular lobes, not emarginate below. *Scutellum* moderately large and distinct. *Elytra* wider than and about thrice the length of prothorax. *Mesosternum* narrowly produced between anterior coxæ; side pieces very unequal, epimeron narrowly triangular, but preventing the episternum from reaching elytra. *Metasternum* the length of basal segment of abdomen; episterna moderately large, angularly enlarged in front. Two basal segments of *abdomen* large, sutures of all distinct, the first arcuate in middle. *Legs* long; coxæ large, anterior approximate, posterior not widely separated and extending to elytra; femora clavate; tibiæ rounded, posterior corbels open; tarsi rather long, third joint wide, deeply bilobed, claw joint elongate; claws free and rather stout. Elliptic, convex, squamose, winged.

Judging by the descriptions, the genus appears to be allied to *Euphalia* and *Atmesia*, from the former separated by the shape of the scape and prothorax and the long legs, and from the latter by the bisinuate base of prothorax, distinct scutellum, elongate metasternum, etc. The mentum is large and rounded anteriorly, the palpi are exposed, the rostrum beneath has distinct lateral sutures as well as a median one, the mandibles are prominent and acute; close behind the anterior coxæ is a remarkable tooth-like projection and which is directed backwards.

MATESIA MACULATA, n. sp.

Brownish-black, shining; scape, tibiæ, and base of femora dull red. Pale green scales almost uniformly clothing the under surface, sparse along middle of rostrum, forming a spot at base of prothorax and numerous small spots on elytra.

Head smooth, finely and sparsely punctate, narrowed from base to eyes. Rostrum with the sides highly polished and finely punctate. Antennæ long and thin; scape slightly shorter than funicle, moderately curved, extending to beyond middle of prothorax; all the joints (but especially the two basal) of the funicle elongate. *Prothorax* convex, sides almost straight, base much wider than apex and strongly bisin-

uate; with small scattered punctures. *Scutellum* slightly longer than wide. *Elytra* considerably wider than prothorax, shoulders strongly rounded, sides parallel to near apex, apex feebly notched; striate-punctate, punctures moderately large and subquadrate; interstices regular and gently convex, much wider than punctures. *Legs* long; femora very feebly dentate; tibiæ fringed beneath with black setose hair, apex crowned with stiff black setæ. Length, 5¼ (rost. incl.); head and rostrum, 2⅛; width, 2 (vix.) mm.

Hab.—N.W. Australia (Macleay Museum), King's Sound (W. W. Froggatt).

The femoral teeth are very small, and are invisible from most directions. On the elytra the spots have a decided tendency to become united at the sides; on both prothorax and elytra the interspaces between the spots of green scales are clothed with blackish scales, which, though individually rather large, are traceable with some difficulty; each of the elytral interstices has a row of pale semi-decumbent setæ, which, on some specimens, are very distinct, but scarcely traceable on others.

SUB-FAMILY LEPTOPSIDES.

Polyphrades vitis, n. sp.

Black, opaque; antennæ, tibiæ, and tarsi obscure reddish. Densely clothed with brown scales, speckled here and there with grey ones or very stout setæ, flanks of prothorax and elytra with patches of distinct white scales, a small patch on each side of middle more distinct on prothorax than on elytra. Under surface and legs with greyish-white scales, the femora annulate near apex; tibiæ with dense and long pale setæ.

Eyes elliptic-ovate, finely faceted. Rostrum almost twice the length of and decidedly narrower than head, apical plate triangular, produced behind in a carina, becoming very obtuse towards the base. Scape long, apex clavate, touching prothorax, almost the length of funicle; first joint of funicle the length of second and third combined; third to seventh gradually decreasing in length; third and fourth globular; fifth to seventh transverse; club elliptic, the length of four preceding joints. *Prothorax* slightly transverse, sides rather strongly rounded, apex slightly narrower than base; ocular lobes finely ciliate; disc rugosely punctate, but punctures entirely concealed. *Scutellum* indistinct. *Elytra* cordate, scarcely twice the length of prothorax, sides near base strongly rounded, base widely and shallowly emarginate, not ridged; striate-punctate, punctures large, but partially concealed; interstices wide and feebly convex. *Tibiæ* very

feebly dentate beneath; claws soldered together except at extreme apex. Length, $4\frac{1}{2}$ (incl. ros.),; width, $1\frac{4}{5}$; variation in length, $3\frac{1}{3}$-$5\frac{1}{2}$ mm.

Hab.—W.A.: Coolup (J. Philippe), Swan River (Mrs. A. M. Lea).

The specimens from Mr. Philippe were sent in to the Department of Agriculture as being very destructive to the young shoots and leaves of the vine. The elytra are provided with setæ, but from no direction do these appear to be either wholly or partially upright; the pale scales are usually dull, but occasionally have a silvery or even golden gloss. There are several specimens under examination which appear to belong to this species, but which have not the very distinct patches of white scales; these patches appear to be more distinct in the females than in the males. The length of the scape in this and the three following species would seem to denote that they belong to *Cherrus*.

POLYPHRADES DESPICATUS, n. sp.

Black, opaque; antennæ, tibiæ, and tarsi obscure reddish. Densely clothed with brown scales, becoming obscure grey towards the sides. Under surface with grey scales, the abdomen in addition with pale setæ. Legs with grey scales, the femora with short, the tibiæ with long setæ.

Eyes elliptic-ovate, finely faceted. Rostrum decidedly longer and narrower than head, apical plate triangular, produced behind in a carina. Scape long, apex slightly clavate and almost touching prothorax, shorter than funicle. First joint of funicle the length of two following combined, fifth to seventh scarcely transverse; club elliptic-ovate, slightly shorter than four preceding joints. *Prothorax* feebly transverse, sides strongly rounded, base considerably wider than apex; ocular lobes feeble; disc densely and finely punctate in front, subrugosely towards base, but all punctures concealed in fresh specimens. *Scutellum* indistinct. *Elytra* ovate; base slightly, the middle considerably wider than prothorax; sides strongly and regularly rounded; striate-punctate, punctures considerably smaller than in the preceding species and almost entirely concealed, interstices wide and feebly convex. Anterior *tibiæ* acutely dentate beneath; claws soldered together for the greater part of their length, and slightly unequal in size. Length, $4\frac{1}{3}$; width, $2\frac{1}{3}$ mm.

Hab.—W.A.: Geraldton.

An obscure species.

POLYPHRADES EXOLETUS, n. sp.

Black; antennæ, tibiæ, and tarsi obscure dull red. Densely clothed with obscure brownish-grey scales, occasionally very

feebly mottled; the sides, especially head and base of rostrum, usually with paler scales than on disc. With numerous rather stout setæ, almost invisible from in front, but very distinct from the sides or behind. Under surface and legs with greyish scales and setæ.

Eyes elliptic-oval, finely faceted. Rostrum longer and narrower than head, apical plate distinctly triangularly notched in front, feebly produced hindward in a carina. Scape long, almost touching prothorax, thickened towards but not clavate at apex; first joint of funicle as long as the two following combined, none of them transverse; club elliptic-ovate. *Prothorax* transverse, sides strongly rounded, base wider than apex: ocular lobes distinct; disc in front finely punctate, punctures concealed, towards base feebly irregularly corrugated. *Scutellum* very minute. *Elytra* subcordate, at base scarcely wider than prothorax, increasing in width to about the middle: striate-punctate, punctures large, approximate, moderately distinct through clothing, very distinct at the sides: interstices wide, feebly convex. Anterior *tibiæ* stouter than usual, strongly curved towards apex and acutely dentate beneath; claws notched at apex. Length, $5\frac{3}{4}$; width, $2\frac{1}{2}$; variation in length, 5-6 mm.

Hab.—Swan River.

Specimens have been taken in abundance by means of the sweep net. On an occasional specimen the scales appear to have a slight golden lustre, but it is extremely faint; several have a very feeble spot of pale scales on each side of middle of base. The facets of the eyes, though small, are larger than in either of the preceding species.

Polyphrades extenuatus, n. sp.

Black, opaque: antennæ scarcely paler. Densely and almost uniformly clothed with grey scales and setæ having a rather loose appearance: on the under paler than on the upper surface and with a silvery lustre.

Shape and sculpture much as in the preceding species, but the prothorax strongly and rugosely punctate except about the apical sixth, and the elytral punctures much stronger, the tibiæ are not so wide at the apex and the claws are more distinctly separated. Length, 5; width, 2 mm.

Hab.—Swan River.

This species is very close to the preceding, but the different colour of the scales and very different punctures of the prothorax (obscured, however, by the clothing), appear to render it distinct.

Polyphrades setosus, n. sp.

Black, opaque. Densely and uniformly clothed with pale subochreous scales, and with very dense and regular stout

setæ. Scales of under surface, legs and antennæ slightly tinged with brown.

Eyes round and finely faceted. Rostrum short, stout, no longer and scarcely narrower than head; scrobes large and deep; apical plate strongly transverse, notched in front, a depression from its apex to head. Scape rather long and stout, curved, scarcely extending to prothorax, considerably shorter than funicle; funicle with cylindrical joints, the first shorter than the second and third combined, fifth to seventh transverse; club acutely pointed. *Prothorax* transverse, sides strongly rounded, base and apex subequal; disc densely and rugosely punctate or granulate, before the scales are removed appearing feebly transversely corrugate: ocular lobes not traceable. *Scutellum* very minute. *Elytra* oblong-ovate, no wider than but about twice the length of prothorax; striate-punctate, punctures large, subquadrate, approximate, distinct through clothing, interstices wide and moderately convex. Anterior *tibiæ* rather stout, distinctly curved at apex, with a few small teeth beneath: claws separated for fully half their length and slightly unequal. Length, 7; width, $2\frac{2}{3}$ mm.

Hab.—N.W. Australia (Macleay Museum).

A very distinct species, in shape resembling *nanus*. The setæ are more numerous and stouter than in any other species with which I am acquainted. The eyes are rather peculiar. On one specimen the deciduous piece of the left mandible is present; it is long (slightly longer than the eye), strongly curved, rounded outwardly and blade-like internally, and is of a shining reddish-brown.

POLYPHRADES GRANULATUS, n. sp.

Black, opaque. Densely clothed with grey scales and with paler and dense setæ. Under surface and legs with greyish scales and setæ.

Head obtusely but distinctly granulate. Eyes rather large, ovate, moderately prominent, finely faceted. Rostrum stout, slightly longer than head, apical plate triangular, slightly raised, continued to between eyes by a narrow acute costa. Scape stout, not clavate, scarcely passing eyes: first joint of funicle as long as two following combined, fifth to seventh feebly transverse: club elliptic. *Prothorax* transverse, sides strongly rounded, base wider than apex: ocular lobes distinct: disc transversely irregularly wrinkled, the elevations punctate. *Scutellum* minute. *Elytra* oblong-ovate, wider than prothorax at base, feebly increasing in width to about the middle: striate-punctate, punctures large, quadrate, approximate, very distinct through clothing: interstices wide, feebly convex. Anterior *tibiæ* curved at apex, with a few

small teeth beneath; claws separated for about half their length. Length, 9½; width, 4¼ mm.

Hab.—Sydney.

The specimen described is from the collection of the late Mr. A. Sidney Olliff, and bears a label in the writing of the Rev. T. Blackburn, "Polyphrades sp. nov." In build it resembles *nanus*, from which it may be distinguished by its clothing and claws.

POLYPHRADES TUMIDULUS, Blackb.

I have numerous specimens from Geraldton (W.A.), which agree very well with Mr. Blackburn's description of this remarkable species, except that they vary from 2⅓ to 3 lines (not 3 to 4).

P. LONGIPENNIS, *Pasc.*	*Hab.*—S.A.
P. ŒSALON, Pasc.	*Hab.*—Mount Barker (W.A.).
P. PUSILLUS, Pasc.	*Hab.*—Geraldton.
P. NITIDILABRIS, Germ.	*Hab.*—S.A.
P. PAGANUS, Bohem.	*Hab.*—Sydney, Windsor, etc.
P. NANUS, Gyll.	*Hab.*—Sydney, etc.
P. LATICOLLIS, Fahrs.	*Hab.*—Swan River.
P. INCONSPICUUS, LAMINATUS, AND PICTUS, Blackb. (co-types).	

ESMELINA* STENOCERA, n. sp.

Black, subopaque; legs and antennæ reddish, tarsi darker than tibiæ. Clothed with round and somewhat golden scales, mixed on the elytra and under surface with pale, stout setæ. Tibiæ clothed all over with long and rather dense setæ, increasing in length from the base, claw joint with rather numerous and erect setæ.

Eyes ovate, finely faceted, prominent. Apical plate slightly longer than wide, feebly depressed along middle; punctate, connected with a narrow and deep ocular fovea by a very indistinct impressed line. Antennæ just passing base of elytra; scape not very stout, thickened at apex and feebly overhanging base of funicle: of the latter all the joints elongate and slightly decreasing in length; club thin, elongate-elliptic, distinctly four-jointed, all the joints longer than wide, the fourth very small. *Prothorax* feebly transverse, subcylindrical, the sides feebly rounded, base and apex equal: ocular lobes very obtuse; disc densely granulate, base feebly margined. *Scutellum* sloping. *Elytra* not raised at base, oblong-ovate, at base considerably wider than prothorax, feebly

* Mr. Blackburn (P.L.S. N.S.W., 1892, p. 122) appears to have doubts as to the propriety of referring this genus to the *Leptopsides*; to me the position (close to *Polyphrades*) assigned to it by Mr. Pascoe appears to be the correct one.

increasing in width to beyond the middle, shoulders subtuberculate; striate-punctate, punctures large, approximate, subquadrate; interstices wide and convex. *Legs* long; tibiæ straight except at apex, with numerous feeble teeth beneath. Length, 13; width, 5 mm.

Hab.—Swan River.

The club of the antennæ is very peculiar. The unique specimen described was obtained under bark of an *Eucalyptus.*

ESMELINA FLAVOVITTATA, Pasc.

The deciduous mandibular processes of this species are remarkably long. In a specimen under examination they are almost as long as the scape, highly polished, curved, narrow, sharp-edged internally, and cross at about their middle.

E. AUSTRALIS, Blackb. *Hab.*—Sydney, Como.

CHERRUS PLEBEJUS, Oliv.

Variable in regard to size and sexually variable in width. The elytral interstices are very variable in regard to their elevations and tuberosities, being sometimes wider and sometimes narrower than the striæ, the alternate ones are usually more highly elevated; the sutural interstices are always smooth and flattish. *C. opatrinus* and *ebeninus* appear to be synonyms.

CHERRUS INFAUSTUS, Oliv.

A variable species in regard to size and shape and the disposition and size of the elytral tubercles; *iodimerus* is without doubt synonymous.

CHERRUS CÆNOSUS, Fahrs.

With doubt I refer three specimens (from Armidale and Glen Innes) to this species. They are smaller than the usual run of *C. plebejus*, from which they may be at once distinguished by the suture of the elytra being tuberculate, and the other interstices tuberculate throughout, and scarcely or not at all alternately raised.

CHERRUS MASTERSI, Pasc.

A specimen under examination (from Mount Barker, W.A.) measures but 7¾ lines.

CHERRUS PUNCTIPENNIS, Pasc.

I have two specimens (from Donnybrook) which agree with Mr. Pascoe's description of this species, except that they are considerably larger (9½ and 11 lines). In both specimens the deciduous mandibular processes are present; they are stout and blunt, and are directed at right angles to the apex of rostrum.

ESSOLITHNA.*
PEPHRICUS.†

The Rev. T. Blackburn, before describing some species of *Pephricus*, remarks‡ on the unsatisfactory separation of the Australian genera of the *Eremnides* from the *Leptopsides*, and gives notes on the variation of the claws; subsequently,‖ when dealing with the *Leptopsides*, he makes almost exactly similar remarks on the claws.

Mr. Pascoe placed *Essolithna* in the *Leptopsides*, and *Pephricus* in the *Eremnides*. I am convinced that *Pephricus* should never have been placed in a different sub-family to that to which *Polyphrades* belongs, and, moreover, that it is synonymous with *Essolithna*. Both supposed genera have a short scrobe, rostrum transversely sulcate beneath, short metasternum, more or less distinct ocular lobes, stout antennæ, apex of rostrum with triangular plate (characteristic of most of the *Leptopsides*), scutellum absent, third and fourth abdominal segments short, hind corbels open, eyes more or less rounded, and, in particular, one claw to each tarsus.❦ To this genus probably also belong the species described by Fahræus¶ as *Polyphrades cinereus*, *murinus*, and *perignarus*.

Of the described species I possess *Essolithna seriata*, Blackb., and *Pephricus squalidus*, Blackb., a specimen of each of which was obtained from Mr. Blackburn, and agrees exactly with his description. Of the others I believe I know *Essolithna rhombus*, Pasc., *Pephricus echimys*, Pasc., and *P. nanus*, Blackb. I do not think that the difference in direction (the shape is almost exactly the same) of the scrobe between *seriata* and *squalidus* should distribute these species between two genera and sub-families.

The Australian genera of the Otiorhynchides are in a very confused state, and will probably remain so until a much more natural system than Lacordaire's is found for separating the genera and higher divisions. It seems very peculiar to constitute and widely separate sub-families all the species of which have deciduous mandibular processes; possibly this system will be along the lines laid down by Le Conte** and followed by Le Conte and Horn.††

* Pascoe, Journ. Linn. Soc., 1869, p. 458.

† Pascoe, T.E.S., 1870, p. 184.

‡ T.R.S., S.A., 1892, p. 230.

‖ Scientific Results of the Elder Exploring Expedition, p. 49.

❦ A character (which might perhaps be regarded as only of specific value) possessed by all the species except *Kingia* is the presence of dense circular and more or less flattened prothoracic granules. Similar granules are to be seen on some of the species belonging to *Polyphrades* and *Cherrus*.

¶ In Schönherr's Gen. et Spec. Curc.

** American Naturalist, July, 1874.

†† The Rhynchophora of America North of Mexico.

Essolithna pluviata, Pasc.

All the species I have under examination are much smaller than the size ascribed to this species (4 lines), the largest being less than 3 lines.

Essolithna rhombus, Pasc.

Four specimens under examination possibly belong to this species; they differ from Mr. Pascoe's description in having punctate granules and the elytral interstices convex. They are from Champion Bay, and vary in length from $1\frac{3}{4}$ to $2\frac{1}{6}$ lines. The species differs from *seriata* (which it much resembles) in being smaller, with a shorter scape, basal joints of funicle differently proportioned and elytral suture thickened posteriorly.

Pephricus echimys, Pasc.

I have three specimens under examination, which I believe belong to this species. The base of the rostrum, however, is distinctly transversely impressed: a character not mentioned by Mr. Pascoe. The species must be very close to *Polyphrades cinereus*, but the elytral suture of that species is described as subcarinate towards apex; from *P. murinus* and *perignarus* it may be distinguished by the long elytral setæ.

Pephricus nanus, Blackb.

Three specimens (from Swan River) probably belong to this species. They vary in length from $1\frac{1}{4}$ to $1\frac{3}{4}$ lines. One of them is without pale markings; two of them have a moderately distinct spot on each side at base of elytra (as mentioned by Mr. Blackburn); and one has in addition a distinct lateral stripe on the prothorax. The rostrum is as described.

Rostrum transversely impressed at base.
  Upper surface with distinct erect setæ.
    Rostrum flat between antennæ ... *echimys*, Pasc.
    Rostrum concave between antennæ ... *fissiceps*, n. sp.
  Upper surface without erect setæ.
    Funicle with second joint slightly longer than first ... ... *seriata*, Blackb.
    Vice versa ... ... *rhombus*, Pasc.
Rostrum not impressed at base.
  Elytra with distinct, erect setæ.
    Elytra striped, non-maculate .. *militaris*, n. sp.
    Vice versa ... ... *maculata*, n. sp.
  Elytra with short setæ, or if with long then it is strongly recurved.
    Scape slightly increasing in thickness to apex ... ... *terrena*, n. sp.
    Scape much wider at apex than at base.

Scrobe distinct to eye	*Kingiæ*, n. sp.
Scrobe terminated before eye.	
Elytra not much wider than prothorax	*squalida*, Blackb.
Elytra considerably wider ...	*nana*, Blackb.
Elytra without setæ	*cordipennis*, n. sp.

ESSOLITHNA FISSICEPS, n. sp.

Black; legs and antennæ obscure red. Moderately densely clothed with round, grey scales, nowhere (in two specimens) forming a pattern, distinct or otherwise. In addition with distinct erect setæ, moderately dense and rather short on prothorax, and long on elytra, on the latter forming a regular series on each interstice; under surface with decumbent setæ.

Rostrum distinctly transversely impressed at base, feebly concave between antennæ, sides above scrobes inwardly oblique. Antennæ thinner than usual; scape fully extending to prothorax; first joint of funicle as long as two following combined, second noticeably longer than third, the others not at all or scarcely transverse. *Prothorax* convex, feebly transverse, sides distinctly, base feebly rounded; with crowded, flat, and more or less circular granules. *Elytra* obovate, at base not much wider than base of prothorax, gradually enlarging posteriorly; punctate-striate, striæ distinct, punctures rather small, subquadrate, scarcely visible through clothing; interstices regular, gently convex. Length, $4\frac{1}{6}$; width, $2\frac{1}{3}$ m.

Hab.—W.A.: Geraldton, Swan River.

ESSOLITHNA MILITARIS, n. sp.

Black; antennæ, tarsi, and tibiæ obscure reddish brown. Densely clothed with scales varying in colour from white to a pale slaty-brown or fawn; sides and under surface with white scales on flanks of head and prothorax, sometimes with a violaceous gloss; elytra with the white scales forming distinct stripes on the sutural and seventh interstices, and less distinct ones on the third and fifth; legs with white scales, the four posterior femora with pale brown rings. Prothorax with short, dense, erect setæ; elytra with long, erect setæ placed in a regular row on each interstice; head and legs with moderately long setæ.

Rostrum very feebly concave between antennæ; scrobes causing the sides above them to appear slightly inwardly oblique. Antennæ moderately long; scape extending to prothorax: first joint of funicle as long as two following combined, fourth to seventh transverse. *Prothorax* and *elytra* as in the preceding species, except that the elytral punctures are larger and are more distinct through clothing. Length, $4\frac{1}{3}$; width, $2\frac{1}{3}$; variation in length, 4 to 5 mm.

Hab.—W.A.: Swan River, Pinjarrah, Darling Ranges.

The description of the clothing has been taken from a very distinctly marked specimen; in most of those under examination more or less distinct stripes are noticeable, but in a few the elytra are uniformly clothed with dingy scales; all have the flanks of the prothorax with white scales, but no markings on the disc; on several specimens the head is entirely clothed with white scales.

ESSOLITHNA MACULATA, n. sp.

Black; antennæ and legs obscure red. Densely clothed with pale brown or slaty brown scales, more or less distinctly mottled with darker and paler scales, especially on the elytra; sides, under surface, and the greater part of the legs with white scales. Setæ much as in the preceding species.

Rostrum slightly concave between antennæ, with a feeble median carina, sides between scrobes distinctly inwardly oblique. Antennæ moderately long; scape extending to prothorax; first joint of funicle as long as second and third combined, third to seventh transverse. *Prothorax* feebly convex, sides strongly rounded in male, rather less strongly in female, base truncate, with crowded, flat, circular granules. *Elytra* rather briefly obovate, scarcely twice the length of prothorax; striate-punctate, punctures moderately large, subquadrate, moderately distinct through clothing. Length, 4; width, 2; variation in length, 3 to 4½ mm.

Hab.—W.A.: Mount Barker (R. Helms).

The scales on the elytra never assume a striped appearance; the white scales sometimes cover a third of the surface, and are usually more plentiful on the shoulders and behind the middle; the larger (female) specimens are more uniformly clothed.

ESSOLITHNA TERRENA, n. sp.

Black; antennæ and legs obscure reddish-brown. Densely clothed with muddy brown scales, scarcely variegated, except on femora and tibiæ, and very indistinctly so on head. With moderately long but strongly curved and decumbent setæ, which are scarcely visible except from the sides.

Rostrum flat and almost parallel-sided between and behind scrobes. Antennæ moderately long; scape comparatively thin, feebly increasing in width to apex, extending to prothorax; first joint of funicle as long as second and third; second as long as third and fourth: third to seventh transverse. *Prothorax* as long as wide, sides gently rounded; disc with very feeble, scarcely raised, subgranular elevations not at all distinct even when the scales have been abraded. *Elytra* elliptic-ovate, sides near base suddenly dilated, then

parallel-sided to one-third from apex; striate-punctate, punctures moderately large, not at all quadrate and not visible through clothing; interstices regular and gently convex. Length, $3\frac{1}{5}$; width, $1\frac{1}{2}$; variation in length, $2\frac{1}{2}$ to $3\frac{1}{3}$ mm.

Hab.—Swan River.

The elytra are (proportionately to the prothorax) much wider than in any species with which I am acquainted, being (at their widest) almost twice the width of prothorax. The prothoracic granules are completely concealed by the clothing, and even after this has been removed they are traceable with difficulty. With the exception of *nana* it is the smallest species hitherto described.

Essolithna cordipennis, n. sp.

Black; tibiæ reddish, antennæ obscure piceous-brown. Densely clothed with sooty scales and with greyish or white scales sparsely distributed, and causing the surface to appear speckled. Elytra without, prothorax and head with very indistinct, legs with moderately distinct, setæ.

Rostrum flat, a narow impression from apical plate to between eyes, sides between and behind scrobes slightly inwardly oblique. Scape stout, noticeably shorter than funicle; first joint of the latter as long as second and third combined; third to seventh transverse. *Prothorax* strongly transverse, sides moderately, base feebly rounded; with dense circular, strongly depressed granules. *Elytra* subcordate: at base noticeably wider than prothorax, sides more or less arcuate from base to apex; striate-punctate, punctures not very large (sutural rows largest), quadrate, scarcely traceable through clothing; interstices feebly convex, and almost regular. Length, 4 (vix.); width, 2: variation in length, $3\frac{3}{4}$ to $4\frac{1}{5}$ mm.

Hab.—W.A.: Geraldton.

Evidently close to *umbratus*, but differently clothed and with only the tarsi reddish.

Essolithna kingiæ, n. sp.

Black: tarsi reddish, antennæ obscure piceous-brown. Densely clothed with sooty brown scales: head and front and sides of prothorax variegated with white scales, which have a more or less decided tinge of green: elytra obscurely variegated with whitish scales; under surface and legs with dingy scales; femora feebly ringed. Upper surface with moderately stout setæ: on prothorax rather dense and recurved, on elytra almost flat (except at base, where, however, they are strongly recurved), and forming a regular series on each interstice.

Eyes more coarsely faceted than usual. Rostrum continuing the convexity of the head: flat between antennæ:

scrobes deep, distinct to but becoming shallow and curved at eyes; sides between and behind them straight, except towards base, where they become slightly outwardly oblique. Scape rather strongly curved, stout, much wider at apex than base, not extending to prothorax, shorter than funicle; first joint of the latter longer than second, but not as long as second and third combined; third to seventh strongly transverse. *Prothorax* feebly transverse, moderately convex, sides strongly, base moderately strongly rounded: without granules, but with large, rounded, deep punctures or foveæ, which are more or less traceable through clothing. *Elytra* briefly subcordate, base noticeably wider than base of prothorax, and rather strongly emarginate; seriate- (scarcely striate-) punctate, punctures much larger than usual (but smaller than those on prothorax), and distinct through clothing, interstices feebly convex and regular, except that the second is slightly wider than the others. Length, 3½; width, 2 mm.

Hab.—W.A.: Pinjarrah (on *Kingia australis*).

This species is decidedly aberrant, but I have thought it best to place it in *Essolithna*, as the only really important features in which it differs are the length of the scrobe and the total absence of prothoracic granules. It is a much shorter and stouter species than any other with which I am acquainted.

LEPTOPS GRANULATUS, n. sp.

Moderately densely clothed with scales varying from ochreous to dark reddish brown: the elytra in places with feeble interrupted pale fasciæ. Abdomen and legs with long thin setæ.

Head somewhat flattened; eyes ovate, not twice as long as wide. Rostrum comparatively thin: deeply channelled in middle, the channel divided in middle by a thin carina, towards each side with a slightly curved sulcus terminating before eye and antennæ; scrobes sinuous, deep, and narrow, distinctly terminated just before eyes; intervening raised spaces punctate. Antennæ long and thin; all the joints of the funicle considerably longer than wide, the first a little longer than third, and shorter than second. *Prothorax* almost cylindrical, longer than wide (4 x 3 ⅘), widest just behind apex; with numerous large granules or small tubercles, each with a setose-puncture; median line feebly marked towards base, more noticeably towards apex. *Elytra* strongly convex, at base scarcely wider than prothorax, widest before the middle: striate-punctate, punctures moderately large, round and not approximate: interstices with numerous shining granules, the third and fifth raised and subtuberculate at summit of posterior declivity. *Legs* very long: femora with

numerous flattened shining granules; tibiæ less noticeably granulate. Length from apex of eyes, 15; rostrum, $4\frac{1}{3}$; width, $6\frac{1}{2}$ mm.

Hab.—Queensland.

My unique specimen was labelled "Qd.," and was probably taken by the late Mr. George Barnard, of Coomooboolaroo. The species (which in shape resembles a gigantic *Apion*) is very distinct from any other known to me; it appears to resemble *subfasciatus* (Pascoe), but that species is described as having a short scutellar stria, the scrobes "ab oculis remotis," and the prothorax subtransverse.

LEPTOPS NODICOLLIS, n. sp.

Densely clothed with pale ochreous scales becoming subferruginous on disc of elytra. Rather densely covered with stout setæ, paler on antennæ, abdomen, and legs than elsewhere, and very dense on rostrum, tibiæ, tarsi, and tubercles and suture of elytra.

Head slightly raised between the eyes; eyes elongate-elliptic. Rostrum stout; rather shallowly channelled in middle, a feeble ridge dividing the channel into two; a rather deep and almost straight sulcus continued from antennæ to near eyes, a short sulcus between it and scrobe; scrobes behind antennæ almost straight, shallow, and terminating before eyes. Antennæ long, rather stout; funicle with all the joints longer than wide, the first longer than second, the others gradually decreasing to apex. *Prothorax* subcylindrical, apparently longer than wide, but really transverse (male $3\frac{1}{2}$ x $3\frac{2}{3}$); somewhat rough, but scarcely tuberculate, a shallow transverse impression interrupted by a small, flattened, shining tubercle in middle; median line marked at apex by a subpyriform impression. *Elytra* wider than prothorax at base, sides much enlarged (but almost straight) to beyond middle; each elytron very feebly produced in middle at base; seriate-punctate, punctures in male deep and moderately close, in female shallower and distant; interstices scarcely raised, posterior declivity almost vertical, marked at summit by a transverse row of four strong, subconical tubercles, of which those on the third interstices are larger than those on the fifth. Length, male $13\frac{1}{2}$, female 19; rostrum, male $2\frac{2}{3}$; width, male 7, female $10\frac{2}{3}$ mm.

Hab.—Cairns (G. Masters).

Allied to *tuberculata* (Boheman), but with stouter rostrum and antennæ, more irregular prothorax, and the shape and tubercles of elytra different.

LEPTOPS MALEFICUS, n. sp.

Densely clothed with ochreous-grey scales, on different individuals varying from almost white to a dingy brown, and

sometimes with a feeble greenish tinge. Rostrum, tibiæ, and tarsi with dense, short, stout setæ, on prothorax shorter and sparser, on elytra moderately dense, and towards the sides and on tubercles becoming longer, darker, and straggling; undersurface and legs with long pale setæ.

Head, rostrum, and antennæ as in preceding, except that the antennæ are thinner. *Prothorax* subcylindrical, in male apparently longer than wide, but at widest as wide (male, 3 x 3); at sides with numerous transverse irregular impressions; median line marked in middle by a raised, shining, somewhat elliptic tubercle. *Elytra* considerably wider than prothorax at base, shoulders oblique, scarcely dilated towards apex in male, strongly in female; seriate-punctate, punctures comparatively small and distant; third and sixth interstices tuberculate from base to summit of posterior declivity, which is crowned with a transverse row of four large tubercles, conical in male, subconical in female, the outer large tubercles are on the fifth (not the sixth) interstice, and immediately below them are several smaller ones; several feeble tubercles on each side near apex. Length, male 13; female 19½; rostrum, male 3⅔; width, male 6⅔, female 10¼.

Hab.—N.Q.: Barron Falls (A. Koebele); Goondi River (W. Freeman).

This species is reported to be very destructive (both in its adult and larval stages) to sugar cane. From the preceding species (which it greatly resembles) it may be distinguished by its elytral setæ, but especially by the tubercles of the third and sixth interstices: in the latter character it approaches *tuberculata*, but the elytra are not at all rounded, as in that species, and the prothorax is different.

LEPTOPS SETOSUS, n. sp..

Male. Densely clothed with scales having a somewhat coppery hue, with (especially on the under surface) a more or less rosy tinge; elytral tubercles, muzzle, tarsi, coxæ, and knees more or less distinctly tinged with green. Densely covered with stout, short, testaceous setæ, longer and paler on antennæ except upper surface of scape; abdomen with the usual setæ more or less intermingled with long, pale, hair-like setæ.

Head feebly depressed between eyes. Rostrum stout; grooved in middle: a short, deep sulcus towards each side, scrobes short, strongly curved, shallow, terminating considerably before the eyes. Antennæ stout: scape short, stout, curved; joints of funicle feebly decreasing in width and length, the second very slightly longer than the first, the others subcylindrical, but all longer than wide. *Prothorax* considerably narrower at apex than at base, slightly trans-

verse ($3\frac{2}{3}$ x $4\frac{1}{2}$), with a number of rather large, deep, and irregular impressions. *Elytra* about once and one-half the width of prothorax at base, more parallel-sided than is usual in the genus, base of each strongly produced in the middle; shoulders oblique, tuberculate; seriate-punctate, punctures strong, deep, moderately close, subgeminate; third and sixth interstices tuberculate from base, the tubercles of third terminating in a large one before summit of posterior declivity, the fifth with a larger one at or just below summit, a small tubercle on each side equidistant between summit and apex. *Legs* moderately long; femora thicker than usual. Length, $15\frac{1}{2}$; rostrum, $3\frac{2}{3}$; width, $6\frac{2}{3}$ mm.

Hab.—N.S.W.: Grafton (E. de P. O'Kelly).

The specimen described when received by me was labelled "*Leptops tuberculata*, Bohem."; it is, however, not that species, from which (and all its allies known to me) it may be at once distinguished by the position of the four larger tubercles, the inner pair being anterior to the outer, instead of posterior as is usually the case.

LEPTOPS CANALICULATUS, n. sp.

Male. Sparsely clothed with pale, short setose scales, causing the derm (both of upper and under surface) to appear slightly hoary; scutellum and rostral excavations densely squamose; antennæ and legs with somewhat glassy scales, intermingled with short, stout, pale setæ.

Head wide, three impressions between eyes, of which the median one is largest. Rostrum wide, strongly dilated to apex; two strong median channels separated by a strong, rounded, and narrow carina; sulcate towards each side; scrobes deep, curved, posteriorly turned up, and joining in with sulci and continued as the lateral impressions near eyes. Antennæ short, rather stout; first joint of funicle as long as second, but apparently shorter. *Prothorax* transverse (6 x 8), sides rounded, decreasing from near apex to base; a strong subquadrate excavation in front of middle; with numerous irregular, shining, vermiform elevations, and with a few granules or small tubercles towards apex. *Elytra* oblong-ovate, not much wider than prothorax at base; densely and coarsely punctate, punctures separated by narrow transverse ridges; third interstice with a row of tubercles, small and rounded at base, becoming larger and conical towards and the largest terminating at summit of posterior declivity; fifth interstice with a few small tubercles in middle, seventh with smaller but more acute tubercles than on third, the largest just below summit of declivity, the next largest and the most acute between it and apex; a small conical tubercle on each side of suture below summit. *Abdomen* irregular towards

the sides, the apical segment channelled down the middle and with a subelliptic impression on each side. Length, 24; rostrum, $6\frac{1}{3}$; width, $10\frac{1}{2}$ mm.

Female. Differs in being much wider, elytra more rounded, tubercles more rounded and smaller, punctures shallower and more irregular, etc. Length, $25\frac{1}{2}$; width, 14 mm.

Hab.—N.S.W.: Mossgiel (C. Fuller).

Belonging to the *tribulus* group, but abundantly distinct from any with which I am acquainted. In both sexes there is a feeble subconical process on each side in front of the anterior coxæ.

LEPTOPS BRACHYSTYLUS, n. sp.

Male. Densely clothed with somewhat ochreous scales (variable individually to a mottled sooty black); abdomen with sooty scales, the sides subochreous; each of the femora with a feeble sooty ring. Above with rather sparse, stout setæ, scarcely denser on rostrum than on prothorax, antennæ densely setose, the setæ increasing in length to apex of funicle; legs and sides of abdomen with rather long, pale setæ.

Head feebly convex, a deep linear impression between eyes. Rostrum stout; feebly grooved in middle, nowhere with shining carina; between middle and each side with a strong and strongly curved deep sulcus, which opens posteriorly near the upper base of rostrum. Scrobes short, deep, oblique, terminated considerably before and beneath eyes. Antennæ rather stout; scape short (scarcely the length of four basal joints of funicle), considerably enlarged to apex; second joint of funicle slightly longer than first, the joints from the third to fifth feebly decreasing, the sixth and seventh feebly increasing in length; club the length of three preceding joints. *Prothorax* transverse ($3\frac{1}{2}$ x $3\frac{3}{4}$); subtuberculate; more or less irregularly excavated in middle, a transverse impression continued across middle, an impression on each side of apex. *Elytra* considerably wider than prothorax; shoulders oblique, tuberculate; sides subparallel to near apex; seriate-punctate, punctures moderately large, round, deep, distant; each with twelve conical tubercles, four on the third, including the three largest, the fourth largest of all, and at summit of posterior declivity, between it and apex, a very small tubercle; three on the fifth, two on the seventh, one on shoulder, and a small one slightly behind it. Length, $12\frac{2}{3}$; rostrum, $3\frac{1}{4}$; width, $5\frac{3}{4}$ mm.

Female. Differs in having shorter and more rounded elytra, tubercles larger at base, and subconical, and antennæ shorter and stouter. Length, $14\frac{1}{2}$; width, $7\frac{3}{4}$ mm.

Hab.—Cairns (G. Masters), Barron Falls (A. Koebele).

The rostrum and antennæ are very peculiar; the clothing appears to be easily abraded, as it is only perfect in two out of seven specimens under examination. The species is allied to *ferus* (Pascoe), from which it may be readily distinguished by the absence of sutural tubercles at the summit of posterior declivity.

LEPTOPS HORRIDUS, n. sp.

Male. Densely and uniformly clothed with scales varying on different specimens from slaty-grey to ochreous and dark brown; abdomen with an elongate, subelliptic, sooty-black patch. Moderately densely covered with short, stout setæ, denser on rostrum than elsewhere; antennæ and legs with pale elongate setæ.

Head with a feeble transverse impression between eyes. Rostrum moderately stout; with a narrow deep channel (more or less obscured by scales) in middle; a short, deep, somewhat curved sulcus on each side; scrobes short, deep, oblique, terminating considerably before eyes. Antennæ moderately long; scape short; joints of funicle subcylindrical, the second longer than first, all of them longer than wide. *Prothorax* feebly transverse (4 x 4½), with several irregular transverse impressions; excavated along middle, the excavation interrupted in middle, anteriorly being horseshoe-shaped, posteriorly irregularly transverse, on each side in front an elevated ridge margining excavation. *Elytra* considerably wider than prothorax, subparallel to near apex; subseriate-punctate, punctures large, more or less rounded, distant or approximate; suture at summit of posterior declivity with two long subcylindrical tubercles scarcely conjoined at their bases; third interstice with four tubercles, of which the basal one is small, and the fourth (before the summit) larger, but not longer, than the sutural; five acute tubercles forming a row almost parallel with those on the third, but on different interstices, the basal one on shoulder, and directed slightly forward, the fifth on fifth interstice level with and very similar to those on suture: a small tubercle on each side near apex, and a small one just behind shoulder. Length, 16; rostrum, 4¼; width, 7½ mm.

Female. Differs in having the elytra slightly more rounded and shorter, the tubercles larger at their bases, and less acute, and the humeral one not at all projecting forward. Length, 18½; width, 8½ mm.

Hab.—Cairns (G. Masters), Barron Falls (A. Koebele).

A narrow, elongate species, not close to any with which I am acquainted; it perhaps belongs to the *tribulus* group.

LEPTOPS ELEGANS.

Male. Head and rostrum with black setæ and white scales intermingled, upper surface of scape with dense blackish setæ; club (except base) brown; prothorax with black scales and setæ, median line marked by white, pink-tinted scales; elytra with sooty-black scales, a very distinct and dense sutural line of snowy scales, at the base pink-tinted; sides from base to apex narrowly margined with snowy scales, a short stripe behind each shoulder tinted with pink. Under surface and legs with snowy scales; flanks of sterna, a spot on each of the anterior coxæ and a blotch on each side of abdomen sooty.

Head **densely punctate, punctures partially concealed. Rostrum less robust than usual; scarcely grooved in middle, but with a thin, shining carina; a short sulcus on each side; scrobes short, oblique, shallow, terminated considerably before eyes. Antennæ moderately long; scape as long as funicle, straight, very feebly thickened towards apex; second joint of funicle slightly longer than first; fourth to sixth transverse.** ***Prothorax*** **cylindrical, apparently transverse, but near apex slightly wider than long (male 3 x 3¼): shallowly excavated along median line; with numerous punctate granules or obtuse tubercles.** ***Elytra*** **considerably wider than prothorax; shoulders oblique, each with a sharp, conical tubercle; sides subparallel to near apex; strongly punctate: third, fifth, and seventh interstices with rather sharp, conical tubercles, small except at summit of posterior declivity on third and fifth.** ***Legs*** **rather long and slender. Length, 12; rostrum, 3¼; width, 5 (vix.) mm.**

Female. Differs in having the dark prothoracic and elytral scales of a sooty brown, the white scales slightly tinged with yellow, and nowhere tinted with pink, almost the entire sides of the elytra with whitish scales, and a few whitish ones about some of the tubercles: the under surface is nowhere distinctly blotched with dark scales. The elytra are considerably wider, widen posteriorly, and the tubercles are less acute. Length, 16: width, 7¾ mm.

Hab.**—N.Q.: Endeavour River (G. Masters), Somerset (C. French).**

A beautiful species approaching the *humeralis* **group, but I do not know a species with which it can be satisfactorily compared. Mr. Pascoe* refers** *Hipporhinus clavus*, **Fahrs., to** ***Leptops.*** **I have not seen M. Olivier's figure of that species, but it is described by Fabricius as "Albicans, thorace canaliculato; coleopteris spinosis; lineolis tribus baseos rubris." It is possible, though it seems hardly possible, that** *clavus* **is the above described species:** *elegans* **could scarcely be called**

* Ann. and Mag. Nat. Hist., 1873, p. 3.

"*albicans*," the male (the only sex having three reddish lines at the base) being clothed with (to the naked eye) deep black scales, except along the suture and sides of elytra and middle of prothorax.

In the type female the deciduous mandibular processes are present; they are long (nearly as long as the three basal joints of funicle), thin, curved towards apex, and sharp internally.

LEPTOPS SPINOSUS, Fahrs.*

This species (which I have from Swan River, Bridgetown, Donnybrook, Karridale, and Lake Muir) is common and variable. Specimens under examination range in length from 7 to 15 mm. (rostrum included). When alive and fresh they are usually densely covered with small, round, white scales and short, whitish setæ, mixed with a pale ochreous dust or meal. The clothing, however, is easily abraded, and the dust is lost in alcohol. In many specimens the scales become sooty and form a large discal patch on the elytra and occasionally on the prothorax; occasionally the whole of the scales have a rosy or golden gloss. In the female the tubercles are less numerous than in the male, are usually (but not always) obtuse, and in some specimens the lateral series almost vanish. The median prothoracic excavation disappears in some specimens. The rostrum is usually indistinctly carinate; sometimes the carina is very distinct, or it may be even replaced by a shallow groove.

LEPTOPS SQUALIDUS, Bohem.

L. Hopei is undoubtedly a synonym of this species, as queried by Fahræus in describing it, and so noted by Mr. Pascoe.† It is one of the most common and destructive species of the genus.

LEPTOPS (CHRYSOLOPUS) TUBERCULATUS, W. S. Macl.

In Masters' catalogue *tuberculatus* is credited to Bohemann. It appears to be the same species (and probably the same specimen) described by W. S. Macleay.‡ Bohemann marked it as Hope M.S., having evidently been unaware (as pointed out by Sir Wm. Macleay)‖ of the existence of W. S. Macleay's paper.

LEPTOPS ECHIDNA, W. S. Macl.

The type specimen of this species with the label attached "*Chrysolopus (?) echidna*, McL., New Holland, Capt. King,"

* I have little doubt but that my identification of this species is correct, and further that *L. dorsatus*, Pasc. is one (there are probably others) of its synonyms.

† Ann. and Mag. Nat. Hist., 1873, p. 3.

‡ King's Survey II., app. p. 445.

‖ T.E.S., N.S.W., I., p. 267.

in the handwriting of the late W. S. Macleay, is in the Macleay Museum. In Masters' catalogue it appears as a manuscript synonym of *tribulus*, but it is neither. It was described in King's Survey II., 1827, app. p. 445. The specimen is a female. Compared with a female of *tribulus* it differs in having the median prothoracic excavation much wider and larger, and also with rather strong lateral excavations, somewhat as in *acerbus*, but more pronounced; the tubercles on the elytra at a glance resemble those of *tribulus*, but differ essentially in the absence of a conjoined pair at the summit of the posterior declivity, the tubercles at the apex of the first row (on the third interstice) are large, and appear to be sutural, but a brief look is sufficient to truly locate them.

L. HUMERALIS, Germ.	*Hab.*—S.A.
L. COLOSSUS, Pasc.	*Hab.*—Geraldton.
L. DUBOULAYI, Pasc.	*Hab.*—Geraldton.
L. SUPERCILIARIS, Pasc.	*Hab.*—Forest Reefs, Dalmorton.
L. TETRAPHYSODES, Pasc.	*Hab.*—Tweed and Richmond Rivers.
L. FERUS, Pasc.	*Hab.*—Cairns.
L. TRIBULUS, Fabr.	*Hab.*—N.S.W., Vic., and Tas.
L. SPINIGER, Fahrs.	*Hab.*—Esperance Bay.

L. INTERIORIS, Blackb. (co-type).

ETHEMAIA APICALIS, n. sp.

Black: antennæ and tarsi dull red. Densely clothed with muddy grey scales. Prothorax with blackish setæ marking position of punctures; elytra with pale setæ, sparse on alternate interstices, more numerous on posterior declivity, and rather dense on tubercles; legs with whitish setæ.

Head and rostrum slightly convex, the convexity apparently caused by two almost concealed ridges. Rostrum short, between antennæ and eyes subquadrate, near mandibles visibly punctate. *Prothorax* subcylindrical, slightly narrower at apex than at base, feebly longitudinally impressed along middle and near sides; sides feebly transversely impressed about the middle; densely and coarsely punctate, punctures entirely concealed by scales. *Elytra* much wider than prothorax, sides subparallel to near apex; shoulders rounded, somewhat thickened; seriate-punctate, punctures large, round, entirely concealed by scales; third, fifth, and seventh interstices distinctly raised, the third and fifth with a distinct conical tubercle at summit of declivity, the fifth with an additional smaller tubercle before summit; a small but very distinct truncate tubercle on each side of apex. *Under surface* with large concealed punctures. *Tibiæ* tipped with black setæ, third tarsal joint feebly bilobed above, entire be-

neath, fourth as long as three preceding combined. Length from apex of eyes, 7; rostrum, $\frac{3}{4}$; width, $2\frac{3}{5}$ mm.

Hab.—N.S.W.: Windsor.

The tubercles at apex of elytra are very distinctive of this species. The eyes are not so widely separated nor concealed as in *Hyphœria assimilis*, and I have preferred on that account to regard it as an *Ethemaia* rather than as a *Hyphœria*. *Hyphœria* and *Medicasta* are founded on very unsatisfactory characters, and I think should be considered as sections of *Ethemaia*. The third tarsal joint in *Ethemaia* is supposed to be bilobed; this is certainly the case with *E. sellata* and *E. angusticollis*, but in a number of others it is feebly bilobed above and entire or almost entire beneath. In *Hyphœria assimilis* it is feebly bilobed above and entire beneath; the ridges over the eyes (as pointed out by Mr. Blackburn) appear to be more satisfactory; *E. curtula* (which I have from Beverley) somewhat resembles *H. assimilis* in this respect, and also as regards the tarsi, and has the eyes forced out, as in that species; and if the two genera are to be recognised it would belong to *Hyphœria*. *Medicasta* is still more unsatisfactory, the species appear to be nothing more than small *Ethemaiæ*.

ETHEMAIA EMARGINATA, n. sp.

Black; antennæ (funicle darker than scape or club), tibiæ, tarsi, sides and apex of elytra dull red. Densely clothed with muddy-brown scales. A few setæ showing at sides of prothorax, sides and apex of elytra; legs with whitish setæ.

Head and rostrum slightly convex, the outline (in non-abraded specimens) not interrupted by ridges or costæ. Rostrum short, broad, dilating to mandibles. *Prothorax* slightly longer than wide (but apparently transverse), sides at apex oblique, basal two-thirds parallel; a moderately distinct median excavation; densely and strongly punctate, punctures entirely concealed by scales. *Elytra* much wider than prothorax, shoulders oblique, somewhat thickened, apex emarginate; seriate-punctate, punctures large, round, subapproximate, concealed; third and fifth interstices distinctly raised, near summit of posterior declivity with a small tubercle, on summit itself distinctly tuberculate. Abdominal punctures traceable. *Tibiæ* tipped with black setæ: third tarsal joint feebly bilobed above, still more feebly beneath. Length, 5; rostrum, $\frac{2}{3}$; width, 2 mm.

Hab.—Forest Reefs.

The clothing of this species is so dense that all traces of punctures are lost on the prothorax and elytra. It is allied to the preceding species, but the apices of the elytra are very different.

ETHEMAIA VAGANS, n. sp.

Black; antennæ, tibiæ, tarsi, and sides of elytra dull red. Densely clothed with muddy-grey scales, a subquadrate blackish patch on elytra, under surface with obscure blackish patches, femora and tibiæ with feeble blackish rings. Legs with white setæ.

Head flat, scarcely wider than rostrum. Rostrum longer than usual, parallel between eyes and antennæ and tricarinate, apex dilated. *Prothorax* narrow, longer than wide, sides rounded in middle and feebly transversely impressed near base and apex: with a feeble median groove; densely and strongly punctate, punctures distinctly visible. *Elytra* much wider than prothorax, shoulders oblique, subtuberculate; apex rounded; seriate-punctate, punctures large, round, their positions distinctly visible through scales; third and fifth interstices feebly raised, each with two almost obsolete tubercles on disc, the third with a distinct tubercle at summit of posterior declivity, fifth with a smaller one below summit, and a still smaller one before it. *Under surface* with positions of punctures visible. *Legs* longer than usual; femora thickened; tibiæ tipped with black setæ; third tarsal joint distinctly bilobed, fourth slightly shorter than three preceding combined. Length, $5\frac{1}{3}$; rostrum, $1\frac{1}{6}$; width, 2 mm.

Hab.—N.S.W.: Richmond River; W.A.: Newcastle.

Allied to but abundantly distinct from *angusticollis*. From the description of *adusta* it differs in the rostrum having three carinæ (or seven, if the lateral ones are counted), the scutellum not raised, and each elytron with only three tubercles about the posterior declivity.

ETHEMAIA FUNEREA, n. sp.

Black; tarsi, base and apex of tibiæ, dull red. Densely clothed with black scales. Under surface and legs with dingy whitish setæ, rostrum with black setæ.

Head densely and distinctly punctate, flat and wide, a feeble ridge slightly projecting over each eye. Rostrum short, broad, narrower than head, with five longitudinal granulate ridges between eyes and antennæ, apex dilated. *Prothorax* subcylindrical, sides very feebly sinuous, apex as wide as base, with large, coarse punctures, only partially concealed. *Elytra* more than twice the width of prothorax; shoulders square, nontuberculate; seriate-punctate, punctures large, round, appearing small and deep through scales: interstices scarcely alternately raised, summit of posterior declivity with a moderately distinct tubercle on third, second with a much less distinct one, two feeble tubercles before summit, fifth with a small tubercle just before and another just below

summit; apex rounded. *Under surface* with punctures traceable. *Legs* moderately long; femora thickened: third tarsal joint bilobed, fourth shorter than three preceding combined. Length, $3\frac{1}{2}$; rostrum, $\frac{1}{2}$; width, $1\frac{1}{3}$ mm.

Hab.—Swan River.

A small and very distinct species, possibly belonging to *Medicasta*, but I prefer to regard it as an *Ethemaia*.

Ethemaia sellata, Pasc.

An abundant and widely distributed species. I have taken specimens at Tamworth, Queanbeyan, Hay, and other places in N.S.W., Murray Bridge and Adelaide in S.A., Beverley and Pelsart Island in W.A., and Hobart, Franklin, and Launceston in Tasmania.

The semilunar brown marking on the elytra mentioned by Mr. Pascoe is rarely present, the scales nearly always being of an uniform colour. The size (including rostrum) ranges from $5\frac{3}{4}$ to $9\frac{1}{4}$ mm.

E. angusticollis, Pasc.

Hab.—Clarence River.

Hyphæria assimilis, Pasc.

Hab.—Queanbeyan.

A specimen from Wilcannia differs in having a spot of white scales on the apex of prothorax, the scutellum white and connected with the prothoracic spot by a feeble whitish median line; the elytral tubercles are also more densely crowned and with paler scales than on the rest of the surface.

Medicasta leptopsoides, n. sp.

Black; antennæ, tibiæ, and tarsi obscure red. Densely clothed with muddy-brown or slaty-grey scales, paler on under than on upper surface. Legs with short, whitish setæ.

Head somewhat flattened. Rostrum about twice as wide as long, narrower than head, with traces of about five feeble ridges. *Prothorax* cylindrical, slightly longer than wide, base and apex equal, with large punctures almost concealed by clothing. *Elytra* wider than prothorax, shoulders rounded, sides feebly increasing to near apex; seriate-punctate, punctures large, round, almost concealed; third, fifth, and seventh interstices strongly raised, the third with a distinct tubercle at summit of posterior declivity, fifth with a tubercle just before and another just below summit. Punctures of *under surface* entirely concealed. *Tarsi* with third joint deeply bilobed, fourth slightly shorter than three preceding combined, subtriangularly dilated to apex. Length, $3\frac{3}{4}$; rostrum, $\frac{3}{4}$; width, $1\frac{1}{3}$ mm.

Hab.—W.A.: Pinjarrah.

Two specimens very different in clothing; on one the scales are uniformly muddy brown, on the other brown mottled with slaty or greenish-grey; they bear a strong general resemblance to many species of *Leptops*.

SUB-FAMILY AMYCTERIDES.

Whilst in Sydney recently I examined some of the specimens of this sub-family in the Macleay and Sydney Museums. Unfortunately, the late Sir William Macleay seldom, if ever, designated his type specimens, so that it is impossible to tell (by the label) when the species is named in both museums, which specimens were his types. Mr. Masters, however, tells me that the majority of them are in the Macleay Museum. A number of the species are referred to wrong genera, but I had not sufficient time to spare to go thoroughly into the question. The following notes, however, were made:—

PSALIDURA.

Mr. Masters believes that this genus does not occur in W. Australia, and such is my own conviction. *P. mira* was recorded from the Swan River by Sir William from a specimen so labelled in W. Sharp Macleay's collection. In the Macleay Museum are a number of duplicates of the species, so many that did the species occur in W. Australia I think that Masters, Brewer, Duboulay, or myself should have taken it.

Sir William appears to have regarded the presence of external anal forceps as an essential feature of the male in *Psalidura*. This supposition I am not willing to admit. I believe that the following species referred by him to *Talaurinus* belong to *Psalidura*:—*Penicillatus*, Macl.; *Riverinæ*, Macl.; *erasperatus*, Er.; and the species he has identified as *morbillosus*, Boi., and *tomentosus*, Boi., in all of which the apical segment of the abdomen is largely transversely excavated, and which have (more or less hidden) anal appendages.

TALAURINUS CAMDENENSIS, Macl.

T. Murrumbidgensis, *rudis*, *salebrosus*, and *rugosus*, Macl., all belong to this species, as also do the specimens labelled *Westwoodi*, Sch., in the Macleay Museum.

TALAURINUS EXCAVATUS, Sch.

The specimen so labelled in the Macleay Museum is identical with the one labelled *rugifer*, Boi. The locality, "Swan River," for the latter, is in all probability erroneous. It does not follow, however, that these names are synonymous.

TALAURINUS SIMILLIMUS, Macl., and T. FOVEATUS, Macl.

These names appear to be synonymous.

SCLERORRHINUS.

I believe Sir William has made far too many species of this genus from the South Australian specimens he had under examination, not having allowed sufficiently for the variation of elytral tubercles, which often differ on the right and left sides of a specimen.

SCLERORRHINUS ADELAIDÆ, Macl.

S. divaricatus and *nodulosus* at least, and possibly *arenosus* and a number of others, are synonymous.

SCLERORRHINUS WATERHOUSEI, Macl.

S. interioris is synonymous.

SCLERORRHINUS ASPER, Macl.

S. sordidus and *acuminatus* are synonymous.

SCLERORRHINUS ANGUSTUS, Macl.

The unique specimen standing under this name in the Macleay Museum is probably a male of *exilis*.

NOTONOPHES.

Mr. Sloane refers but one species (*Cubicorrhynchus cichlodes*) to this genus. The following species should also be referred to it:—*Talaurinus dumosus* and *spinosus*, Macl., and *lemnus* and *pupa*, Pasc. I do not believe, however, that all these names will eventually stand.

ACANTHOLOPHUS CONVEXIUSCULUS, Macl., and HYBORRHYNCHUS MASTERSI, Macl.

I have carefully examined the types of the above in the Macleay Museum (and also the specimens so named in the Sydney Museum), and find them identical. The species belongs to the same genus as *Cubicorrhynchus spinicollis*, Macl. does.

AMYCTERUS DRACO, W. S. Macl.

I have a male specimen (from Killerberrin, W.A.), which, on comparison with the type specimen of this species, appeared to agree with it, except that the prothorax had five tubercles on one side and six on the other side of the middle.

A specimen (probably from the Murchison), which appears to be the female of the species (unknown to both the Macleays), differs in being much larger than the male (34 by 13 mm.), the prothorax more decidedly flattened at the sides, the elytral tubercles much smaller and flattened, and the lateral row (except at apex), almost obsolete: the apex is strongly mucronate (the mucros fully a millimetre in length), thickened, and obtusely granulate (not with a regular series of small

tubercles). The abdomen is not at all punctate, though somewhat rugose in places. The prothorax has four distinct tubercles on each side, the median space between them being wider than in the male.

MOLOCHTUS TIBIALIS, Sloane.

I have received a specimen from the Adelaide Museum (with an Elder Expedition label in Mr. Helms's writing) as this species. Compared with a female of *gagates*, from Geraldton (Champion Bay), it presents the differences mentioned by Mr. Sloane,* but these differences entirely disappear when compared with the male of that species. My specimen also agrees with Mr. Sloane's description, except that the prothoracic granules are setigerous, instead of being, as he describes them, "punctured at apex, but not setigerous." Possibly his specimen was somewhat abraded.

ÆDRIODES HUMERALIS, n. sp.

Entirely black, opaque, with sparse and very minute dingy scales scattered about. Granules with short setæ, muzzle and legs (especially tibiæ) with long black setæ.

Head flattened, impunctate. Rostrum impunctate, with three feeble impressions; apex with a shining subobcordate, slightly concave punctate space, separated by grooves from the rest of the rostrum. *Prothorax* subglobular; apex trisulcate, median sulcus largest and deepest, open behind but not to base, the ridge on each side of it with smaller granules and denser setæ than elsewhere; with rather large, round granules, each of which bears a seta in its middle. *Elytra* at base not as wide as middle of prothorax, but at apical third considerably wider; suddenly declivous near apex; disc with numerous small shining seta bearing granules, sides with very small shining simple granules; third interstice raised, produced at base, about middle thickened and terminated, at summit of posterior declivity with a large tubercle; fifth interstice raised, arched, and considerably produced at base, at summit of posterior declivity dilated into a tubercle rather less than that on third, and less pronounced in character, except when viewed from behind. *Under surface* with a few small punctures; apical segment transversely impressed. *Legs* long and thin. Length, 11; width, 5 mm.

Hab.—W.A.: Mount Barker.

Moderately close to *nodipennis*,† and, like that species, resembling to a certain extent some of the species belonging to *Mythites* and *Sosytelus*.

* T.R.S. S.A., xvi., p. 413.

† This species was recorded from and I have taken it on the Swan River. In the catalogue it appears as coming from South Australia.

ACHERRES GLOBICOLLIS, n. sp.

Black, opaque, with numerous stout black setæ, and with four small but distinct patches of dingy white scales: one on each shoulder and one at some distance behind it; a few small scales on the sides about the middle.

Head feebly wrinkled, a few large punctures below and behind eyes. Rostrum with large punctures, with two strong, coarsely punctured ridges overhanging the eyes and almost united in front. *Prothorax* almost globular, with large, regular, closely set mamilliform tubercles, all of which are concave and supplied with setæ. *Elytra* briefly ovate, much wider than prothorax, not once and one half as long as wide; sides with large punctures or foveæ, towards suture becoming irregular and submamilliform: each with two rows of about five conical tubercles, which become larger and more acute towards and terminate at summit of posterior declivity: an acute posthumeral tubercle. Length, 9; width, $4\frac{2}{3}$ mm.

Hab.—W.A.: Fremantle.

The tubercles at the base of the inner row on each elytron are more round than conical, and are very distinctly punctate; the outer rows consist of five tubercules on one side and six on the other in the type. It differs from *mamillatus* (which I have from Geraldton), in having the rostral crests much stouter and more coarsely punctate, the prothorax more globular and with regular, uniform, more strongly elevated, and smaller mamilliform tubercles; the elytra are supplied with larger punctures, with larger and less numerous tubercles, and the clothing is different.

ODITESUS TIBIALIS, n. sp.

Entirely black, opaque, with small setose greyish scales, moderately dense on head, prothorax, and sides of elytra, and causing the upper surface to appear very dingy. Granules with small, the legs with long, black setæ; middle almost to apex of anterior tibiæ with a very dense fringe of setæ.

Head largely excavated, a feeble median ridge on each side between eyes. Rostrum sparsely punctate: base with a large subconical elevation, which is feebly divided along its middle, and punctate and setose throughout. *Prothorax* subglobose, with a distinct (but not deep), complete median excavation, each side in front with an oblique excavation, with large (larger at sides than in middle), round granules, each of which is punctured and bears a seta. *Elytra* at base not much wider than prothorax in middle, but considerably wider towards apex; with series of punctures much interrupted on disc, but becoming more regular and foveate on flanks; third and fifth interstices more or less raised, the elevated parts densely granulate, both (third slightly, fifth largely) pro-

duced at base on to prothorax, third with three or four (in the specimen under observation three on the right and four on the left elytron) clusters of granules forming feeble tubercles and a distinct tubercle at summit of posterior declivity. *Under surface* and *legs* with dense, shallow, slightly rugose punctures; apical segment transversely impressed. *Legs* long and thin. Length, 9: width, $4\frac{1}{6}$ mm.

Hab.—W.A.: Mount Barker.

To the naked eye the fringe of setæ cause the tibiæ to appear strongly bisinuate beneath. The excavation on each side of the median one in front of the prothorax is very distinct when seen from in front, but indistinct when viewed from behind. From some directions each elytron appears to be supplied with four distinct tubercles, but the only real tubercles are those at the summit of the posterior declivity, the others being little more than clusters of granules—except perhaps the one on the middle of the fifth interstice. The species is very distinct from *lycosarius* (the only described species with which I am acquainted) and much resembles *Ædriodes nodipennis*. There are two other species in my possession, but each is represented by a single battered specimen.

SUB-FAMILY RHYPAROSOMIDES.

PHRYNIXUS ASTUTUS, Pasc.

When in Melbourne recently I received from the National Museum a specimen of this New Zealand species, as coming from Victoria.

ZEPHRYNE PERSONATA, n. sp.

Very densely clothed with muddy-greyish scales entirely concealing the punctures and derm. With straggling semi-erect setæ: dark on upper surface both of body and legs, and pale on under surface of body and legs.

Head apparently shallowly concave in middle, with a lateral extension completely concealing each eye from above. *Prothorax* feebly transverse, disc and sides very uneven, apex feebly produced, but not elevated. *Elytra* wider than prothorax, shoulders produced and subtuberculate, alternate interstices distinctly raised. Length, $3\frac{2}{3}$: width, $1\frac{1}{2}$ mm.

Hab.—N.S.W.: Glen Innes.

Having only one specimen under examination I have not cared to abrade the scales to make sure of the sculpture, except on a portion of the elytra, which is seen to be covered by very large quadrate punctures. The species differs from the description of *sordida* in being smaller, by having the prothorax not at all oblong, and by having the alternate interstices of the elytra (although distinctly raised) entirely without tubercles.

MANDALOTUS CAMPYLOCNEMIS, n. sp.

Black; antennæ and tarsi of a dingy red. Densely clothed with muddy scales, entirely concealing the derm, and mixed here and there with a few stout semi-upright clavate setæ. Under surface less densely clothed than upper, and with more numerous and stouter adpressed setæ. Legs with numerous elongate setæ, the intermediate tibiæ in the male with long, thin hair towards apex.

Rostrum somewhat curved, strongly carinate, the carina sometimes almost concealed. Scape straight except at extreme base. First joint of funicle slightly longer than second. *Prothorax* strongly transverse, apex considerably narrower than base, median groove very distinct, with numerous obtuse tubercles in male, in the female slightly irregular and with small, scattered granules; very feebly punctate. *Scutellum* small and indistinct. *Elytra* subcordate: at base narrower, about the middle wider than prothorax; seriate-punctate, the punctures rather large and round, and showing almost as geminate striæ through clothing; suture beyond middle, second, fourth, and sixth interstices obtusely tuberculate, the second and sixth at base distinctly tuberculate, a distinct tubercle about shoulder. *Tibiæ* strongly curved in front, dilated at apex, less noticeably so in female than in male, and in the intermediate than the others. Length, $6\frac{1}{2}$ (incl. rost.): width, $2\frac{2}{3}$; variation in length, $4\frac{1}{2}$-$7\frac{1}{2}$ mm.

Hab.—Clarence River.

The curvature of the apical portion of the anterior tibiæ in the male is so great as to be almost at right angles to the base, and is much greater than in *valgus*, which species it somewhat resembles. In the male the basal segment of the abdomen is strongly transversely depressed, in the female the depression is scarcely traceable.

NOTE.—The colour of the above and of nearly all of the following species can only be seen after the scales have been abraded. When the punctures and granules or tubercles of the prothorax and elytra are described without mentioning the clothing, such description has been drawn up from intentionally abraded specimens.

MANDALOTUS PILIVENTRIS, n. sp.

Black: antennæ and tarsi of a dingy red. Densely clothed with muddy scales which entirely conceal the derm, and with numerous stout setæ, more numerous and depressed on prothorax, on elytra sublinear in arrangement and suberect. Legs with stout setæ, the anterior and to a slightly less extent the posterior tibiæ in the male fringed beneath with long, soft hair.

Rostrum stout, curved, strongly carinate along middle, the carina sometimes concealed. Scape straight, not very stout; two basal joints of funicle subequal. *Prothorax* dilated in middle, apex slightly narrower than base, median line feeble; with small regular obtuse tubercles, neither tubercles nor median line showing through clothing. *Scutellum* small and indistinct. *Elytra* in male narrower than prothorax at base, and wider beyond middle; in female as wide at base and slightly increasing to beyond middle; seriate-punctate, punctures moderately large, round, and regular, the interspaces densely punctate, finer punctures entirely concealed; suture, second, fourth, and sixth interstices slightly raised. *Tibiæ* moderately strongly curved, and all (the intermediate less noticeably than the others) dilated at apex. Length, 6; width, 2½; variation in length, 5-7 mm.

Hab.—N.S.W.: Clarence River, Windsor, Sydney.

The basal segment of the abdomen in the male is strongly depressed, and clothed with long setæ between the coxæ, in the female it is but feebly depressed and the clothing is normal; the sutural interstice is slightly contracted near the base, but dilates beyond the middle, so that the rows of punctures appear to be somewhat curved. Numerous specimens of both this and the preceding specimens were obtained during a flood. Although the sculpture of abraded specimens is seen to be very different, perfect specimens are not very dissimilar, but they are readily distinguished by the clothing and shape of the tibiæ.

MANDALOTUS SCABER, n. sp.

Male. Black; antennæ and legs dull red, tarsi pale red. Clothing as in the preceding species, except that the tibiæ are not clothed beneath with long hair.

Rostrum stout, curved, carinate. Scape thinner than in the preceding species and slightly curved, two basal joints of funicle subequal. *Prothorax* strongly transverse, apex distinctly narrower than base; median line distinct, with numerous obtuse tubercles, and which are traceable through clothing. *Scutellum* small and very indistinct. *Elytra* ovate, small, considerably narrower than prothorax at base, and nowhere as wide as prothorax at its widest; base semicircularly emarginate; seriate-punctate, the punctures moderately large; each with a few obtuse tubercles, of which the most distinct are on the second and sixth interstices at base and one behind each shoulder. Basal segment of *abdomen* widely depressed, the depression continued from metasternum. All the *tibiæ* strongly curved and dilated at apex, the posterior suddenly narrowed close to apex. Length, 5; width, 2 mm.

Hab.—Tweed River.

A small species somewhat resembling *campylocnemis* and *valgus*, from both of which it may be readily distinguished by its large prothorax and small elytra.

MANDALOTUS AMPLICOLLIS, n. sp.

Male. Black; antennæ and tarsi of a dingy red. Very densely clothed with muddy-brown scales, not only concealing the derm, but even the positions of the punctures. Prothorax with stout, suberect setæ, on the elytra becoming sublinear in arrangement. All the tibiæ fringed beneath with long, soft hair, but rather sparser on the anterior than on the four posterior.

Rostrum stout, distinctly curved, non-carinate; scrobes deep. Scape stout, shorter than usual. First joint of funicle once and one half the length of second. *Prothorax* large, much less transverse than usual, sides rounded, apex scarcely narrower than base; densely punctate, with small, regular, seta-crowned granules, median line just traceable through clothing. *Scutellum* not visible. *Elytra* comparatively small, almost the width of prothorax at base, and scarcely wider elsewhere; seriate-punctate, punctures rather large and round; interspaces finely punctate, alternate interstices raised. Basal segment of *abdomen* widely depressed, the depression continued on to second segment, but small, and bounded behind by a distinct ridge. *Tibiæ* stouter than usual, strongly curved, apex of the anterior so strongly curved as to be almost drawn backwards. Length, 6; width, 2½ mm.

Hab.—Forest Reefs.

The scape is shorter than in any other species with which I am acquainted. The clothing is so dense that the sculpture is entirely hidden; many of the suberect setæ on the elytra are more like stout, soft scales than true setæ. The rostrum is dilated at the middle and non-carinate, the apical plate being abruptly terminated.

MANDALOTUS SPURCUS, n. sp.

Blackish: antennæ and tarsi of a dingy red. Moderately densely clothed with muddy scales mixed with a few setæ. Anterior tibiæ in the male rather feebly fringed beneath with long, soft hair.

Rostrum stout, curved, narrowly carinate, the carina sometimes almost concealed. Scape almost straight; first joint of funicle slightly longer and noticeably thicker than second; club larger than usual. *Prothorax* moderately transverse, sides rather feebly rounded, apex as wide as base, median line feeble, disc almost smooth. *Scutellum*

small, not traceable through clothing. *Elytra* oblong-ovate, in both sexes wider than prothorax, widest in female; seriate-punctate, punctures round and close together; alternate interstices scarcely visibly raised; a feeble tubercular elevation behind each shoulder. *Tibiæ* rather stout, not strongly curved, bisinuate beneath, not very wide at apex. Length, 5: width, 2 mm.

Hab.— N.S.W.: Sydney, Windsor.

The very obtuse tubercular elevations of the prothorax and the feeble median line are entirely concealed by the not very dense clothing: the elytral punctures are rather larger than usual. The female is considerably wider than the male, but otherwise the sexual differences are not very pronounced.

MANDALOTUS EXCAVATUS, n. sp.

Male. Blackish; antennæ and tibiæ of a dingy red. Densely clothed with dark muddy scales, interspersed with stout setæ. Legs with stout setæ, the tibiæ not fringed beneath with long hair.

Rostrum moderately long, narrowly carinate. Scape rather stout: first joint of funicle almost twice the length of second. *Prothorax* and *elytra* much as in the preceding, but the tubercular elevations of the prothorax very distinct and regular. Basal segment of *abdomen* strongly depressed in middle, the depression bounded at each corner by a distinct ridge. *Tibiæ* much as in the preceding, but thinner. Lengtn, 4: width, $1\frac{2}{3}$ mm.

Hab.—Brisbane (A. J. Coates).

MANDALOTUS SUTURALIS, n. sp.

Blackish: antennæ, tarsi, and suture of elytra of a dingy red. Not very densely clothed with small, rounded scales and with numerous stout setæ, on the elytra becoming linear in arrangement, and very conspicuous on the suture and alternate interstices. Legs setose, the anterior tibiæ of male rather sparsely fringed beneath with moderately long hair.

Rostrum moderately stout, curved, strongly carinate. Scape straight and moderately stout: first joint of funicle noticeably longer and stouter than second. *Prothorax* slightly transverse, sides moderately round, base and apex almost equal, with small, closely packed, rounded, and regular tubercles: median line just traceable either on perfect or abraded specimens. *Scutellum* small, transverse, indistinct. *Elytra* oblong-ovate; in male scarcely, in female distinctly wider than prothorax: seriate-punctate, the punctures comparatively small and round, appearing in geminate rows through clothing: alternate interstices scarcely visibly raised, but slightly wider than the others. *Abdomen* transversely

wrinkled or corrugated in male, the basal segment narrowly impressed across base and across middle of apex. *Tibiæ* curved, bisinuate beneath, not largely dilated at apex. Length, $4\frac{1}{2}$; width, $1\frac{2}{3}$ mm..

Hab.—N.S.W.: Armidale, Inverell.

The colour of the elytral suture is sometimes traceable without removal of scales, but when these have been abraded it shows up very distinctly. The small and regular prothoracic tubercles are very distinctive.

MANDALOTUS PINGUIS, n. sp.

Blackish; antennæ and legs obscure reddish-brown, tarsi paler. Not very densely clothed with small, round, grey scales (in certain lights having a golden-green reflection) obscurely mottled with small brown patches. With numerous stout setæ, conspicuous but scarcely linear in arrangement; at the sides (especially of the elytra) becoming rather long and resembling the clothing of the legs; this is thin and straggling, and scarcely longer on the tibiæ than elsewhere.

Rostrum short, stout, curved, non-carinate. Scape almost straight, stout at apex; first joint of funicle obtriangular, as long as the two following combined. *Prothorax* feebly transverse, rather strongly rounded: densely and finely punctate; without tubercular elevations and without median line. *Scutellum* not traceable. *Elytra* subovate, distinctly wider than prothorax, widest before middle: shoulders rounded; seriate-punctate, punctures small and close together; interstices wide, regular, and flat. Two basal segments of *abdomen* strongly punctate, the others with denser and smaller punctures. *Tibiæ* almost straight on their outer edges, all (but especially the posterior) large at apex. Length, $5\frac{2}{3}$; width, $2\frac{2}{3}$ mm.

Hab.—Rottnest Island.

A rather short, stout species, without rostral carina: from *ventralis* it may be distinguished by the absence of prothoracic tubercles, from *punctiventris* by having no median line, and from *pilosus*, to which it is closest, by the shorter and sparser clothing, less strongly curved tibiæ, wider elytral interstices, and smaller punctures.

MANDALOTUS PALLIDUS, n. sp.

Testaceous, under surface livid. Not very densely clothed with obscure muddy scales. With numerous moderately long, suberect setæ, darker and more numerous on the prothorax than on the elytra, on the latter they are sublinear in arrangement: tibiæ in male fringed beneath with long, soft hair, less noticeable on the intermediate than on the others.

Rostrum short, curved, distinctly carinate. Scape straight, increasing to apex; two basal joints of funicle elongate, the first longer and stouter than second. *Prothorax* widely transverse, apex noticeably narrower than base; disc smooth and without tubercular elevations; median line narrow, as distinct before as after removal of scales. *Scutellum* small, but distinct. *Elytra* in male scarcely, in female considerably wider than prothorax; seriate-punctate, punctures moderately large and round (smaller in female than in male); interstices feebly convex, the alternate ones feebly raised. Basal segment of *abdomen* with a semi-circular row of strong punctures. *Tibiæ* slightly curved, bisinuate beneath, moderately dilated at apex. Length, 5½; width, male 2, female 2⅔ mm.

Hab.—Sydney.

Had I seen but one specimen I would probably have considered it immature, but as there are fourteen under examination, all agreeing in colour, I have no doubt but that the colour as described is that of fully matured specimens. The species is not very close to any here noticed or described.

MANDALOTUS RETICULATUS, n. sp.

Blackish; antennæ, prothorax, tarsi, and base of tibiæ dull reddish-brown. Sparsely clothed with small rounded scales. The elytra with very distinct but not numerous setæ. Tibiæ moderately densely setose, but scarcely fringed beneath.

Rostrum moderately stout, curved, acutely carinate. Scape slightly but distinctly curved; first joint of funicle almost twice the length of second. *Prothorax* moderately transverse, base and apex subequal, closely covered with small and very depressed but distinct tubercles; median line not at all traceable. *Scutellum* small, moderately distinct. *Elytra* oblong-ovate, not much wider than prothorax; seriate-punctate, punctures not very large; interstices regular and finely punctate. Basal segment of *abdomen* with a semi-circular row of strong punctures. *Tibiæ* curved, the intermediate bisinuate beneath, the posterior curved outwards on apical half. Length, 3; width, 1¼ mm.

Hab.—Inverell.

The prothorax appears as if the elevations were less like tubercles than owing to numerous narrow impressions, in this respect differing esentially from those of *saturalis*. The curvature of the posterior tibiæ is remarkable.

MANDALOTUS PUSILLUS, n. sp.

Male. Blackish; antennæ, prothorax, tarsi, tibiæ, and base of femora obscure reddish-brown. Sparsely clothed with

small, ochreous-grey scales. With stout, dark, suberect setæ on the elytra, really linear in arrangement, but scarcely appearing to be so when viewed directly from above. Under surface sparsely and almost uniformly setose. All the tibiæ (but the intermediate less noticeably so) fringed beneath with long, soft hair, rather sparser and longer than is usual.

Rostrum moderately stout, not depressed at base, and non-carinate. Scape comparatively thin, very feebly curved; first joint of funicle about once and one half the length of second. *Prothorax* transverse, rounded, somewhat depressed, smooth; finely punctate, and with a feeble median line. *Scutellum* small. *Elytra* not much wider than prothorax, widest near base: seriate-punctate, punctures rather large and subquadrate: interstices feebly convex, and very feebly alternately raised. Basal segment of *abdomen* with a semicircular row of strong punctures, the second with a few scattered large punctures, apical segment densely and finely punctate. *Tibiæ* strongly curved, suddenly at apex of posterior. Length, 3: width, $1\frac{1}{4}$ mm.

Hab.—Swan River.

Somewhat resembles *suturalis* and the preceding, but may be at once distinguished by its smooth prothorax. The eyes are rather more coarsely faceted and more advanced in position than usual. On the specimen described both of the deciduous mandibular processes are present, they are curved, directed outwards, and but slightly decrease in width to apex, their colour is red with the tip blackish.

MANDALOTUS SUBGLABER, n. sp.

Black, somewhat shining; antennæ (the club black), tarsi, and base of tibiæ dull reddish brown. Sparsely clothed with very small grey scales, and with subdepressed and not very stout setæ. Tibiæ very feebly fringed beneath.

Rostrum moderately stout, not depressed at base, distinctly costate. Scape almost straight, rather suddenly thickened near apex; first joint of funicle obtriangular, twice as long as second. *Prothorax* transverse, closely covered with small, flattened tubercles; median line narrow and indistinct. *Scutellum* scarcely traceable. *Elytra* oblong-ovate, in male scarcely, in female distinctly wider than prothorax; seriate-punctate, punctures large and subquadrate; interstices convex and regular. Basal segment of *abdomen* depressed in middle, the depression continued on to second segment and to metasternum. Anterior *coxæ* almost approximate: tibiæ rather feebly curved and feebly bisinuate beneath. Length, 4: width, $1\frac{2}{3}$ mm.

Hab.—Forest Reefs.

A small, shining species which may be easily distinguished by the colour of the antennæ.

TIMARETA.

This genus is remarkably close to *Mandalotus*, being separated therefrom only by the character of the ungues.

TIMARETA FIGURATA, Pasc.

This species (which I have from Geraldton, Bunbury, Swan River, and Rottnest Island) occurs (as also does *T. crinita)* in abundance at the roots of beach-growing plants. The white scales are exceedingly variable in disposition and extent, and are frequently tinged with a pretty green; on some specimens the whole of the scales are of a pale, muddy green, in others they are more or less coppery; the second abdominal segment is usually clothed with greenish scales. *T. satellina*, Pasc., I have no doubt whatever, is only one of its numerous varieties.

T. CRINITA, Pasc.

Hab.—Geraldton, Swan River.

SUB-FAMILY TANYRHYNCHIDES.

XYNÆA UNIFORMIS, n. sp.

Black; antennæ, tarsi, and apex of rostrum feebly diluted with red. Densely clothed all over (except at the sides and apical third of rostrum) with dingy greyish and somewhat rounded scales, perfectly uniform in tint, except that those of the under surface are slightly paler. With somewhat stout, depressed setæ at regular intervals, but less numerous on under surface and elytra than elsewhere.

Rostrum the length of prothorax, basal half convex and ridged, the ridge continued to apex, but the rostrum in front of the antennæ somewhat concave. Scape lightly curved. *Prothorax* large, transverse, sides rounded, base feebly rounded, apex more than half the width of base; with rather dense and large punctures, the interspaces finely punctate, with a feeble median line; neither line nor punctures traceable through clothing. *Elytra* in male narrower at base than widest part of prothorax, in female as wide; widest at about one-third from base, regularly convex, conjointly rounded at apex, posterior declivity rather abrupt, seriate-punctate, punctures moderately large and round; interstices flat, considerably wider than punctures, themselves rather densely punctate, but the punctures concealed. *Under surface* and legs densely punctate. Basal segment of *abdomen* almost as long as three following combined; apical segment feebly depressed in male, gently convex in female. *Tibiæ* with a few small teeth beneath, all at apex crowned with stiff black setæ most noticeable on the posterior. Length, male 3; rostrum, $1\frac{1}{3}$; width, $1\frac{3}{4}$ m.

Hab.—King's Sound (W. W. Froggatt).

In four specimens under examination, two (which I regard as males) differ from the others in being smaller, with larger prothorax, smaller elytra, and with somewhat different abdomen; one of them has the derm almost entirely of a dull red colour.

X. SAGINATA, Pasc. Hab.—S. Australia.

SYNAPTONYX OVATUS, Waterh. *Hab.*—N.W. Australia.

SUB-FAMILY ATERPIDES.

PELORORRHINUS AMPLIPENNIS, n. sp.

Moderately densely clothed with obscure greyish, feebly mottled with sooty and brown scales, but nowhere forming a distinct pattern. Prothoracic punctures with stout scales becoming setose in middle. Rostrum clothed throughout, the apex with long bristles: apices of all the joints of the funicle with long setæ; tarsi with long setæ, especially noticeable on the claw joints.

Head densely and in front deeply punctate: a feeble ridge (conjoined and slightly raised in front) on each side between eyes. Rostrum largely excavated in front, near base with a narrow transverse ridge, behind which is a slightly concave space; flanks coarsely and confluently punctate to base, finely in front except on upper portion, which is almost impunctate. Club elongate-ovate, longer than three preceding joints combined. *Prothorax* longer than wide (4 x 3⅔ mm.), sides slightly dilated in middle, base not much wider than apex: with numerous small granules not very clearly seen through clothing. *Elytra* raised above and fully twice the width and four times the length of prothorax, sides very feebly diminishing from near base, and not suddenly rounded at apex: with regular series of large, shallow, quadrate punctures: interstices feebly raised, very much narrower than punctures, with almost obsolete granules, except for a few moderately distinct ones near base and suture. Length, 18: width, 6⅓ mm.

Hab.—W.A.: Mount Barker (Macsorley and Lea).

To the naked eye the prothorax appears to be marked by two dusky, longitudinal, slightly curved lines. If *Pelororrhinus* is to be maintained it may be necessary to erect a genus to receive this species and *angustatus*, and another to receive the species described below as *Rhinaria aberrans*.

P. CRASSUS, Blackb. *Hab.*—S. Australia.

P. SPARSUS, Germ. *Hab.*—S. Australia.

P. ANGUSTATUS, Fahrs. *Hab.*—Swan River.

RHINARIA CAUDATA, n. sp.

Densely clothed with small scales, varying from ashen grey to dingy black: prothorax with a feeble median line and several small spots of pale scales; elytra with three dark, oblique fasciæ: a narrow one at base (commencing on shoulders), a wide one (very indistinct towards suture) about middle, and an indistinct one near apex. Rostrum glabrous except for a few bristles at apex.

Head densely punctate, punctures confluent in front and causing numerous short ridges to appear: crests strongly curved, conjoined in front. Rostrum gently concave: flanks coarsely and irregularly punctate. Club shorter than three apical joints of funicle, the apical joint of the latter with a little of the club's sensitised pubescence. *Prothorax* densely punctate, each puncture containing a small shining granule, each of which is punctured in middle. *Elytra* suddenly and largely narrowed at apical fourth, each separately produced at apex; seriate-punctate, punctures large, subquadrate; interstices narrower than punctures, third, fifth, and seventh distinctly raised; at base and sides with small, shining, reddish granules. *Under surface* with moderately dense, large, round, and deep punctures. Length, 10½; width, 4⅛; variation in length, 10½-12 mm.

Hab.—N.S.W.: Riverstone (Miss King), Galston (S. Dumbrell).

A very distinct species. Many of the abdominal and a few of the sternal punctures do not bear scales or setæ. On one of the specimens the elytral granules are almost black, and the scales are so dense as entirely to conceal the punctures of the upper surface.

RHINARIA CONCAVIROSTRIS, n. sp.

Densely clothed with scales varying from ashen grey (pale on under surface and legs) to dingy brown or black; frontal crests pale ochreous: prothorax with three feeble longitudinal stripes of pale scales: elytra with the pale scales covering the majority of the surface: the dark scales forming a wide fascia beyond middle (narrowed towards suture) and somewhat blotchily distributed towards base and apex; scutellum with white scales. Punctures of prothorax and elytra with larger spatulate scales, becoming setose in middle of the former. Rostrum glabrous.

Head with dense punctures which are partially confluent in front, crests moderately large, feebly curved, narrowly but distinctly separated throughout. Rostrum feebly concave: base considerably elevated: flanks not very coarsely but irregularly punctate. Club slightly longer than three preceding joints combined. *Prothorax* with large round

punctures slightly confluent in places. *Elytra* with regular series of large subquadrate punctures: interstices regular, each with a regular row of shining dark granules, larger and more flattened towards base than apex. Punctures of *under surface* much as in the preceding, but each bearing a seta. Length, 9½; width, 4; variation in length, 9½-13 mm.

Hab.—Q.: Upper Endeavour River (C. French), Port Denison (G. Masters).

The prothoracic punctures are so large that their walls are broken in places and cause the surface to appear to be covered with granules: this appearance is visible in many other species of the genus.

RHINARIA SULCIROSTRIS, n. sp.

Densely clothed with pale ochreous-brown scales, in places feebly variegated with paler or darker scales: prothorax with a feeble and indistinct pale median line, and numerous spots transversely placed in middle; under surface and legs scarcely paler than upper. Prothorax with dense suberect scales in punctures, becoming subsetose towards middle: elytral punctures with stout scales: the interstices, in addition to the ordinary scales, each with a row of stout, pale, decumbent scales, almost as large as (but narrower than) those in punctures. Rostrum sparsely clothed in middle, the apex with sparse, stout bristles.

Head very densely punctate: crests curved, moderately large, joined in front. Rostrum slightly concave, feebly transversely wrinkled at base; flanks very coarsely and irregularly punctate, towards apex and top scarcely punctate, sulcate towards bottom. Club elongate-elliptic, slightly longer than four preceding joints combined. *Prothorax* with dense round punctures, the walls of which are of unequal thicknesses, and cause the surface to appear to be granulate. *Elytra* with regular series of large, subquadrate punctures; interstices regular, with small granules towards base. Punctures of *under surface* each bearing a large, stout scale, except that on the apical segments they become setose. Length, 12; width, 4¾; variation in length, 10½-12 mm.

Hab.—W.A.: Mount Barker (R. Helms and S. Macsorley)

The very long club is this species' most distinctive feature; the eyes are less ovate than in *stellio*.

RHINARIA BISULCATA, n. sp.

Densely clothed with pale, soft, ochreous-brown and very pale yellow scales, the whole having a soft, speckled appearance. Prothorax and elytra with the usual stout scales. Rostrum both on flanks and along middle with distinct setose scales or setæ.

Head with dense, but concealed, punctures; crests large, moderately curved, feebly separated (on one specimen connected in front) throughout. Rostrum decidedly concave; base ridged; flanks coarsely and irregularly punctate; lower portion narrowly bisulcate. Funicle with the second joint much shorter than the first; club moderately long, ovate. *Prothorax* with numerous black, glossy granules, showing through clothing. *Elytra* with series of large, quadrate punctures; interstices regular, much narrower than punctures, each with a regular row of piceous-red granules, very distinct throughout, but small towards apex. Punctures of *under surface* rather less numerous than usual, each (except of apical segments of abdomen which are setose) bearing a rather stout scale; metasternal episterna each with a single row. Length, 8½; width, 3½; variation in length, 8½-10 mm.

Hab.—N.Q.: Upper Endeavour River (C. French); N.S.W.: Sydney (Lea).

The two grooves of the lower portion of the flanks of the rostrum are sometimes obscured by clothing. The club is more elongate than in *cavirostris*; the second joint of funicle, much shorter than the first, separates it from the description of *debilis*.

RHINARIA FAVOSA, n. sp.

Not densely clothed with dingy scales; prothoracic and elytral punctures with stout scales; elytral interstices with regular series of stout scales. Rostrum glabrous.

Head densely punctate, punctures slightly confluent in front; crests not very large, feebly curved, not united in front. Rostrum convex, but at extreme base feebly concave, and with a median ridge which divides the crests; flanks with a few small punctures towards base. Club elongate-ovate. *Prothorax* feebly flattened in middle, with dense, round, clearly cut, non-confluent punctures; the surface nowhere granulate. *Elytra* with regular series of large subquadrate punctures; interstices regular, each with a regular row of rather large, flattened, glossy, reddish granules, becoming smaller and convex towards apex. Punctures of *under surface* rather denser than usual, each (especially on sterna) bearing a large scale. Length, 9; width, 3½ mm.

Hab.—W.A.: Geraldton.

The clothing on the unique specimen under observation is perhaps somewhat abraded, but the species (on account of the prothoracic punctures) is a very distinct one.

RHINARIA TRAGOCEPHALA, n. sp.

Moderately densely clothed with dingy scales, nowhere forming a distinct pattern, but darker on prothorax than on

elytra; scutellum with whitish scales; under surface and legs with dingy greyish scales. Prothoracic and elytral punctures and interstices of the latter towards apex with stout scales. Rostrum glabrous.

Head densely punctate; crests very large, in front with three very distinct raised shining processes: the median one largest and subcordate, the two others at the sides and slightly to the rear, and subcylindric or subconical. Rostrum convex; flanks moderately regularly punctate, except that the punctures increase in size to (although not very large at) base. Club ovate, noticeably shorter than three preceding joints combined. *Prothorax* with large round punctures, the walls of which are frequently absent in places, and cause rather large granules to appear; middle sometimes with a short, irregular carina. *Elytra* with series of large subquadrate punctures; interstices regular, much narrower than punctures, each with a regular row of glossy, reddish granules, distinct to, but very small at, apex. *Under surface* with dense punctures, each of which (except on apical segments of abdomen) bears a stout scale. Length, 11½; width, 4¼; variation in length, 8-12 mm.

Hab.—Q.: Upper Endeavour River, Somerset (C. French), Gayndah (G. Masters); W.A.: Geraldton (Lea).

The three very distinct processes marking the front of the very large crests render this species remarkably distinct; from in front they cause the head (including the rostrum) to look remarkably like that of a goat.

RHINARIA SIMULANS, n. sp.

Densely clothed with dingy scales, on the elytra obscurely mottled with small sooty patches; scutellum with whitish scales. Prothoracic punctures and elytral punctures and interstices (the latter much more distinctly than usual) with stout scales. Rostrum glabrous.

Head densely punctate: crests very large, each side in front with a raised, moderately shining process. Rostrum convex, even at base: extreme base on each side with a narrow extension; flanks finely and regularly punctate except at base, where the punctures are more crowded. Club ovate, no longer than two preceding joints. *Prothorax*, *elytra*, and *under surface* as in the preceding species, except that the granules are smaller and those on the elytra darker. Length, 11½; width, 4 mm.

Hab.—N.S.W.: Queanbeyan.

A very distinct species: the frontal crests are scarcely as large as in the preceding species, the processes are only two in number, and are partially obscured by clothing.

RHINARIA ABERRANS, n. sp.

Upper surface sparsely, legs moderately, under surface densely clothed with whitish scales. Prothoracic punctures with indistinct larger scales. Rostrum glabrous.

Head densely punctate: crests entirely absent, but a feeble longitudinal impression between eyes. Rostrum strongly convex, base not raised above the rest, but thickened between eyes; flanks rather strongly but not densely punctate. Funicle with the second joint as long as scape and slightly longer than first; club elongate-ovate, much stouter than funicle, longer than three preceding joints combined. *Prothorax* with small granules, sides with rounded punctures. *Elytra* with series of large quadrate punctures; interstices regular or feebly alternately raised, much narrower than punctures; not granulate. Punctures of *under surface* more or less concealed, but apparently large and scale or seta bearing. Claw joint rather stouter, the claws smaller than usual. Length, 6; width, $2\frac{1}{5}$; variation in length, $4\frac{1}{2}$-6 mm.

Hab.—W.A.: Mount Barker (R. Helms).

A very small species. The absence of frontal crests, the long second joint of funicle, and the great (proportionate) width of the club are at variance with the other species belonging to *Rhinaria*. Of four specimens under examination three appear to be partially abraded, but one I believe to be in perfect preservation.

RHINARIA CONVEXIROSTRIS, n. sp.

Densely clothed with greyish or very pale brown scales, paler on scutellum, under surface, and legs than elsewhere: the elytra with a distinct blackish fascia beyond middle, which is narrowed, and more or less interrupted towards suture. Prothoracic and elytral punctures with larger scales. Rostrum glabrous.

Head densely punctate; crests moderately large, feebly curved, indistinctly united in front. Rostrum convex; flanks irregularly, but not coarsely or densely, punctate. Club elongate-ovate, slightly longer than three preceding joints combined. *Prothorax* with large round punctures, the walls of which are frequently broken so as to cause glossy depressed granules to appear. *Elytra* with series of moderately large and somewhat rounded punctures; interstices regular, much narrower than punctures, each with a row of reddish, glossy granules, which become very small towards apex. *Under surface* densely punctate, each puncture bearing a more or less setose scale, those on the sterna being scarcely stouter than on the abdomen. Length, 9; width, 4 (vix.); variation in length, $8\frac{1}{2}$-10 mm.

Hab.—S.A.: Venus Bay (C. French).

Remarkably close in general appearance to *concavirostris*, but at once distinguished by the rostrum. The elytral granules are not constant, as of three specimens under examination, two have them convex throughout. whilst the third has them depressed and larger towards base.

RHINARIA SIGNIFERA, Pasc.

Mr. C. French has sent me a number of specimens from North Queensland (Cooktown, Somerset, and Upper Endeavour River), which agree exactly with Mr. Pascoe's description of this species. They vary in length from 4½ to 6 lines.

RHINARIA CAVIROSTRIS, Pasc.

A very variable species as regards size and markings. I have specimens from Victoria River (Mitchell's expedition), Brisbane (A. J. Coates), and Whitton, Tamworth, and Clarence River.

RHINARIA STELLIO, Pasc.

This handsome species may frequently be seen on young shoots and leaves of various species of *Banksia*. When alive they are frequently marked with small patches of ochreous scales, but these become almost obsolete in spirits. I have specimens (from Albany, Swan River, and Pinjarrah) varying in length from 12 to 21 mm.

R. TIBIALIS, Blackb.	*Hab.*—N.S.W.: Sydney, Galston, Forest Reefs, Cootamundra.
R. RUGOSA, Boi.*	*Hab.*—Sydney.
R. TRANSVERSA, Boi.*	*Hab.*—Sydney, Forest Reefs.
R. GRANULOSA, Fahrs.	*Hab.*—N.S.W.: Wallerawang.
R. TESSELATA, Pasc.	*Hab.*—Swan River.
R. CALIGINOSA, Pasc.	*Hab.*—N.S.W.: Bungendore.

Rostrum concave along middle.
- Elytra suddenly narrowed towards and separately produced at apex ... *caudata*, n. sp.
- Elytra gently arcuate towards and conjointly rounded at apex.
  - Rostrum glabrous along middle ... *concavirostris*, n. sp.
  - Rostrum more or less distinctly setose or squamose along middle.
    - Interstices of elytra alternately raised ... ... *transversa*, Boi.
    - Interstices regular.
      - Elytra with a distinct white transverse complete fascia near middle ... ... *signifera*, Pasc.

* I am doubtful as to whether these species are correctly identified or not, but they are so named in the Macleay and Sydney Museums.

Elytra non-fasciate
Club elongate-elliptic.
Interstices of elytra with regular and very distinct shining granules ... *stellio*, Pasc.
Interstices very feebly granulate and only towards base ... ... *sulcirostris*, n. sp.
Club ovate.
Elytral granules more or less concealed ... ... *cavirostris*, Pasc.
Elytral granules distinct throughout ... ... *bisulcata*, n. sp.
Rostrum convex in middle.*
Disc of prothorax with clearly defined, non-confluent punctures ... ... *favosa*, n. sp.
Prothorax granulate, or if punctate then punctures decidedly confluent.
Frontal crests with three raised shining processes (one in front and one each side) ... ... *tragocephala*, n. sp.
Frontal crests with two raised processes (one on each side) ... *simulans*, n. sp.
Frontal crests absent ... ... *aberrans*, n. sp.
Frontal crests without raised processes.
Interstices of elytra alternately raised.
Flanks of rostrum setose ... *granulosa*, Fahrs.
Flanks of rostrum glabrous ... *calignosa*, Pasc.
Interstices regular.
Median ridge continued between crests from base of rostrum *rugosa*, Boi.
Rostrum truncate at base, or at least in middle of base.
Elytra with a distinct black fascia (interrupted at suture) just beyond middle *convexirostris*, n. sp.
Elytra non-fasciate.
Granules of elytra rather large, flat, and decidedly red ... ... *tessellata*, Pasc.
Granules of elytra small, convex, and dark ... *tibialis*, Blackb.

RHINOPLETHES FOVEATUS, Pasc. — *Hab.*—W.A.: Swan River, Albany.
ATERPUS TUBERCULATUS, Gyll. — *Hab.*—Sydney, etc.
A. RUBUS, Bohem. — *Hab.*—Tasmania.
A. CULTRATUS, Fabr. — *Hab.*—N.S.W. (widely distributed).
A. GRISEATUS, Pasc. — *Hab.*—N.S.W.: Tweed and Richmond Rivers: Q.: Brisbane.
IPHISAXUS ASPER, Pasc. — *Hab.*—W.A.: Mount Barker.

* Usually concave at apex and base.

I. ŒTHIOPS, Pasc. *Hab.*—Mount Barker.
ÆSIOTES LEUCURUS, Pasc. *Hab.*—N.S.W.: Sydney, Bindogundra.
Æ. NOTABILIS, Pasc. *Hab.*—Wide Bay.

SUB-FAMILY HYLOBIIDES.

CYCOTIDA LINEATA, Pasc. (M.C. 5099).

Mr. Champion writes me that this species (recorded as from Western Australia by Mr. Pascoe) is really Californian, and = *Otidocephalus vittatus*, Horn.

SUB-FAMILY BELIDES.

BELUS GRANULATUS, Lea.

I find that this is but a variety of *B. centralis*. I have typical specimens of the latter from Sydney and Victoria.

BELUS ABDOMINALIS, Blackb.

This is a synonym of *B. parallelus*, Pasc. The species can be readily identified by its narrow form and by "each of the first four segments having a transverse row of three sharply defined round denuded spots" (Blackburn); or, as Mr. Pascoe says:—"Abdomine segmentis quatuor basalibus maculis tribus denudatis margine posteriore notatis."

SUB-FAMILY BALANINIDES.

BALANINUS.

All the Australian species of this genus differ from the five British species *(turbatus, villosus, betulæ, rubidus, and salicivorus)* that I have under examination, by having the third tarsal joint dilated to a much greater extent, with the claw joint just passing its apex. Of the previously described Australian species *amœnus* (from Sydney*) may be readily recognised by its black colour and by the presence of four prothoracic, five elytral, and a scutellar spot of snowy scales; *Mastersi* (from Port Denison) has a post-median elytral fascia (primarily caused by semi-denuded spaces), and with an unusually long rostrum in the female.

For the opportunity of describing the new species I am indebted to Mr. George Masters:—

Clothing forming patterns.
  Legs black ... ... *amœnus*, Fab.
  Legs more or less red.
    Elytra with a post-median fascia *Mastersi*, Pasc.
    Elytra with longitudinal markings as well ... ... *intricatus*, n. sp.
Clothing uniform or almost so.
  Funicle with first joint as long as the second ... ... *æqualis*, n. sp.
  Funicle with the first joint distinctly longer than the second.
    Shoulders produced ... ... *delicatulus*, n. sp.
    Shoulders rounded ... ... *submaculatus*, n. sp.

* I have just received a specimen of this species from Mr. Geo. Compere, who captured it at Brisbane.

BALANINUS INTRICATUS, n. sp.

Male. Dark red, legs (except knees and tarsi), rostrum (but not mandibles), and antennæ (except club) paler. Densely clothed with setose scales, varying from almost white to reddish brown; the pale scales form five lines on prothorax (with single ones scattered rather thickly about), clothe the scutellum, basal third of suture, the third interstice beyond the middle (between these the scales are also pale), and form a feeble oblique fascia just beyond the middle, but not extending to sides or suture; on each elytron three dark patches may be seen: one close to suture, one about middle commencing on third interstice, and one between it and apex, but confined to the third interstice. Legs with pale, the under surface with still paler, scales.

Rostrum with narrow punctate grooves on each side behind the antennæ. Antennæ inserted in exact middle (if the mandibles are excluded) of rostrum; first joint of funicle almost as long as the second and third combined. Punctures of *prothorax* and *elytra* traceable with difficulty; third interstice of the latter apparently feebly raised posteriorly; shoulders rounded. Length, $3\frac{1}{3}$; rostrum, $1\frac{3}{4}$; width, 2 mm.

Female. Differs in having the rostrum considerably longer ($2\frac{1}{2}$ mm.), less curved, and with the punctures in simple series instead of in grooves; antennæ inserted nearer the base; the clothing denser and rather paler (the elytral suture is almost entirely clothed with pale scales and the short postmedian fascia is very distinct), but with the dark markings on the elytra more sharply defined.

Hab.—Sydney (Macleay Museum).

The scattered pale prothoracic scales are placed transversely on the male, but obliquely on the female.

BALANINUS ÆQUALIS, n. sp.

Female. Reddish-brown; mandibles darker, rostrum and antennæ paler. Moderately densely and almost uniformly clothed with pale ochreous (or dark stramineous) scales, slightly darker on elytra and paler on legs than elsewhere.

Rostrum moderately densely punctate at sides of basal fifth, elsewhere sparsely punctate. Antennæ inserted just behind the middle of rostrum; two basal joints of funicle equal in length, their combined length equal to that of the remaining joints. *Prothorax* (except front margin) densely punctate. *Elytra* punctate-striate, the punctures deep, the striæ narrow, but sharply defined: interstices transversely wrinkled, shoulders produced. Length, 5; rostrum, $3\frac{1}{6}$; width, 3 mm.

Hab.—Cairns (type in Macleay Museum).

In the specimen described the middle of the prothorax is almost nude, but this appears to be due to abrasion.

Balaninus delicatulus, n. sp.

Female. Of a very pale red, knees, tarsi, and mandibles darker. Rather densely clothed with stout, adpressed white scales, denser on middle of prothorax, suture, and under surface than elsewhere.

Rostrum with small and moderately dense punctures, not much denser, but rather larger towards base than elsewhere. Antennæ inserted three-sevenths from base of rostrum; first joint of funicle stouter than and the length of the two following combined. *Prothorax* with the punctures concealed. *Elytra* distinctly striate, with moderately distinct punctures; shoulders very decidedly produced. Length, $3\frac{4}{5}$; rostrum, 2; width, $1\frac{1}{5}$ mm.

Hab.—N.W. Australia (type in Macleay Museum).

To the naked eye the elytra appear to be feebly mottled, but this is owing to the scales being rather thinner in places, and allowing the derm to be seen.

Balaninus submaculatus, n. sp.

Female (?). Reddish-brown; legs, rostrum (but not mandibles), and antennæ paler. Densely and uniformly clothed with dark stramineous (or pale ochreous) scales (slightly paler on under surface); on each elytron near the apex is a small patch of slightly paler scales, immediately behind which is a small, dark, semi-denuded space, so that the patches (which are of the same shade as the scutellar scales) are rendered rather distinct.

Rostrum equally curved throughout; sparsely and finely punctate. Antennæ inserted nearer base than apex; first joint of funicle almost as long as the two following combined. *Prothorax* with the punctures concealed. *Elytra* with the punctured striæ almost concealed, but the punctures marked by larger scales; shoulders rounded. Length, $4\frac{1}{2}$; rostrum, 3 (vix.); width, $2\frac{1}{2}$ mm.

Hab.—N.S.W.: Kiama (type in Macleay Museum).

In this species the eyes are coarsely faceted (almost twice as coarsely as in the British *turbidus*), whilst in the three preceding they are finely faceted.

SUB-FAMILY LAEMOSACCIDES.

Laemosaccus.

I did not notice till quite recently that there was an omission of a line in the tabulation of the genus, given in P.L.S., N.S.W., 1896, p. 312. Line 15:—"Elytra more or less red," would appear to govern *querulus*, *longimanus*, *subsignatus*, *funereus*, and *dubius*, instead of *querulus* only: line 16 should have been:—"Elytra entirely black."

NOTES ON SOUTH AUSTRALIAN MARINE MOLLUSCA, WITH DESCRIPTIONS OF NEW SPECIES, PART I.

By JOS. C. VERCO, M.D. (Lond.), F.R.C.S. (Eng.), etc.

[Read August 2, 1904.]

PLATE XXVI.

Dentalium intercalatum, *Gould.*

Proc. Bost. Soc. Nat. Hist. vii., p. 166 (1859); Otia, p. 119; Sowerby in Conch. Icon., xviii., pl. vii., fig. 45 (1872). Type locality, China Seas (North Pacific Expl. Exped.). Pilsbry in Tryon's Manual of Conchology, vol. xvii., p. 25, pl. xi., figs. 88, 89. *D. Bednalli*, Pilsbry & Sharp, Man. of Conch., vol. xvii., p. 248, pl. xxxix., figs. 1, 2, 3; type locality, St. Vincent Gulf (W. T. Bednall). *D. octogonum*, Angas (non Lam.), P.Z.S., 1878, p. 868, Henley Beach, S.A.

Angas misidentified our shell from Henley Beach as *D. octogonum*, Lam., and cited it as a South Australian shell in P.Z.S., 1878, p. 868. Pilsbry & Sharp, in Tryon's Man. of Conch., vol. xvii., p. 248, described a shell under the name of *D. Bednalli*, from St. Vincent Gulf, sent to them by Mr. W. T. Bednall. This name would stand, were it not that specimens of our extremely variable species are inseparable from *D. intercalatum*, Gould, 1859, which has priority.

I have examined more than three hundred individuals, dredged by me in St. Vincent and Spencer Gulfs, Investigator Strait, and Backstairs Passage. They have been taken alive at all depths between eight and twenty-two fathoms, chiefly in muddy bottoms. I have vainly endeavoured to discover more than one species among them. They are exceedingly variable, and were it not for intermediate forms, quite a dozen species might be created.

Its length varies, of course: firstly, with its age: individuals when very young are only 5 millimetres, when senile 37; secondly, with the amount of its posterior end which has been removed, so that a stouter, older shell may not be so long as another which is evidently younger and has not suffered so much truncation.

Its curvature is also very variable. In its early stage of growth it is well curved, but becomes gradually, though markedly, less so as it gets older. Since the posterior end is progressively removed, the mature shell has an appearance quite different from that of the immature, being nearly straight and bluntly truncated, instead of well curved and posteriorly acuminate. The same individual in its two extreme stages of growth, without the controlling intermediate

examples, might be excusably described as distinct species. This probably partly explains why the name of *D. Bednalli*, Pilsbry & Sharp, has been added to that of *D. intercalatum*, Gould, the former being an old individual, and the latter a young one.

One shell, compared in the Natural History Museum, London, with that labelled *D. intercalatum*, Gould, was identical, and represents our immature, curved, sharp-pointed stage. The figure given in Tryon's Man. of Conch. corresponds with it, as does also the description there transcribed, even to the origin of its secondary riblets, first in the two interspaces on the outer curve, and somewhat later in the lateral ones and on the concave side, as italicised in the manual. Hence, though the type locality of this species is given as China Seas, the identity of our South Australian form is indisputable.

The number of ribs very rarely remains the same throughout the entire length of the shell; thus one with eleven rather acute ribs at the posterior end has but eleven at the anterior. Almost always the ribs become more numerous with age. The increase is effected in two ways, by intercalation and by rib splitting.

1. By intercalation. Generally in the centre of an interspace a riblet arises, and gradually enlarges until it equals the original ribs. The stage of growth at which this begins is variable, not only in different shells, but in the several interspaces of the same shell. For instance, when the individual is quite immature every interspace may bear a riblet, whereas when senile there may be only the first indication of one. Again, one interspace may show a riblet very soon, and later, other interspaces may develop them at varying distances as in the typical *D. intercalatum*. Besides these secondary riblets, eventually tertiary riblets may arise in their interspaces and further multiply the costations. Still another variation is to be soon—instead of a single secondary costula arising in an interspace, two riblets of equal dimensions may develop simultaneously. This twin intercalation alone may be found in an example, or there may be every combination of single and double intercalation.

2. By rib-splitting. A groove begins to form in a rib, and gradually grows in depth and width until it divides it into two. This groove may begin on the centre or on any part of the side of the rib. The ribs so formed may subsequently be cut up by other grooves. Sometimes two or three of such furrows may appear on the same rib at the same time and enlarging at an equal rate form three or four subequal riblets.

The two methods, intercalation and rib-splitting, may occur alone in respective individuals, or both in the same example, and there may be any conceivable ratio between the two methods in different specimens.

The contour of the ribs may vary greatly. They may be at their inception narrow and comparatively high, and may so continue throughout their length. Or after some increase in size they may begin to decline in height until they almost fade out and leave the anterior part of the shell nearly smooth. Their shape may completely change; whereas, at first, they may have concave interstices so as to resemble a fluted column, the ribs may widen out and become convex, while their interstices become reduced to narrow, shallow grooves between broad, approximate, rounded ribs.

The number of ribs at the posterior end is very variable. If multiplication of costæ occurs, it is plain that the older the shell and the more truncated, the greater will be the number of ribs at the posterior extremity; and if such multiplication always began at the same stage of growth and was equally rapid, the number would always be greater with a greater truncation. But such is not the case, hence the number of ribs at the hinder end varies widely. Six is the fewest I have found. But there may be any number beyond this up to fourteen, which is the most yet observed. These larger numbers are by no means restricted to examples with much truncation, nor is there any definite proportion between the number of ribs and the diameter of the shell: some of large diameter at the truncation have but few, and *vice versa*. A diagnosis framed upon the number of ribs would be baseless. Pilsbry suggests the typical form is hexagonal; probably he is right, but usually there are more than six costæ.

The anal appendical tube is wanting in most cases, even during life. When present it may be two or three millimetres long. It may exist when the shell is young and narrow, and be wanting when old and wide: possibly it may have been broken off. It is central and most frequently in the axis of the shell. But it may be distinctly out of the axis, joined at an angle so as to point markedly towards the concave side, or slightly towards the convex, and in one it is funnel-shaped instead of cylindrical. These circumstances confirm the suggestion of its being an outgrowth subsequent to truncation, and not merely a residual inner layer of the shell after the outer portion has been absorbed.

The radula (pl. xxvi., figs. 14*a*, *b*, *c*, *d*) is comparatively large, and contains fifteen rows of teeth, with the formula 1.1.1.1.1. The rachidian tooth is about twice as wide as high, is thickened along its free edge, and thinned along

its attached border. The single lateral is stout and rather short, and has one obliquely placed cusp without serrations. The marginals are trapezoidal flat plates, thickened along their inner end, and the whole or larger part of their upper margin. Mr. Kesteven, in executing the drawings, detected a small accessory plate of chitin (fig. 14*d*). It is somewhat pyriform, stouter at its narrow, attached end, and thinner and slightly striate at its free, expanded extremity. Its height is about one-half that of the rachidian tooth, outside of which it stands, with its base about half-way between this and the lateral. As the laterals overlap the outer fourth or third of the rachidian, this plate lies behind or between the laterals, and being comparatively thin it cannot be seen through the much denser laterals: but in a dismembered radula it can be certainly recognised.

Cadulus acuminatus, *Tate.*

This shell is first referred to as a South Australian species by G. F. Angas, in a paper entitled "A List of Additional Species of Marine Mollusca . . . of South Australia," in Proc. Zool. Soc. of November 5, 1878, p. 868, species 44, *Cadulus acuminatus* (?) Desh., M.S. in coll., Cuming; Holdfast and Aldinga Bays (Tate): also Port Jackson. In the Trans. and Proc. Roy. Soc. of South Australia, vol. ix., p. 194, 1887, Tate, in a paper of October 5, 1886, on "The Scaphopods of the Older Tertiary of Australia," includes *Cadulus acuminatus*, of which he gives a short description, cites it from the "oyster beds of the Upper Aldinga series," and says, "the species is not uncommon in shell sand on the shores of St. Vincent Gulf." In the Manual of Conchology, vol. xvii., p. 183, Pilsbry gives *C. acuminatus*, Tate, pl. xxxii., figs. 47, 48, 49, with a full description.

I have dredged it in St. Vincent and Spencer Gulfs and Investigator Straits and Backstairs Passage at five fathoms, (14 dead), at nine fathoms (29 dead and 3 alive), at seventeen fathoms (80 dead and 12 alive and 7 initial tubes), besides 35 dead and 5 alive at unrecorded depths. These living examples enable me to make some additions to and alterations in Pilsbry's description of what were doubtless beach-rolled specimens. Though glossy and smooth to the naked eye, under the microscope very fine, crowded transverse scratchings are visible. Though usually quite clear and glassy, but for the white opaque internal callous ring near the posterior end, many individuals have fine, milky, transverse lines, and some have opaque, white, subdistant, interrupted bands, or on one side a group of round or oval white blotches.

The posterior end has not a continuous, smooth margin, but is irregular, and has a minute, triangular spine, which projects from it at a very slight angle on the convex border of the shell (pl. xxvi., figs. 5 and 6). This end shows signs of fracture, and suggests that it is not the actual commencement of the shell, but has been broken off from an earlier segment.

Dredged with these are what at first sight appear to be another form of *Cadulus*, or a minute *Dentalium*, measuring up to four or five millimetres in length. These are curved like a juvenile *Dentalium*, and gradually increase in diameter and become less curved. They are evidently fractured at their attenuate posterior extremity, and show a minute, triangular projection from its margin on the convex side. After a very slight inflation near their anterior extremity they are constricted, and then begin to expand again into a funnel-shaped portion, which may measure one, two, or three millimetres in length. This end is irregular in outline and evidently fractured. The funnel is clear and glassy, whereas the dentalium-shaped tube is like ground glass from very fine, crowded, transverse, milky lines. Some individuals lack the funnel, and end at the constriction.

In one instance the posterior end of a *Cadulus acuminatus* has slipped into the funnel-shaped extremity of one of these shells, and allows a comparison to be made between them.

In my opinion this dentalium-like shell is the juvenile stage of the *Cadulus acuminatus*. When it has grown to a certain length and diameter there is a trifling inflation, then it becomes definitely constricted, somewhat obliquely, and then begins to expand to form the mature shell. After a time the earlier portion becomes detached at the constriction, and in the fracture a tiny, projecting spine is left on the adult portion at the convex side, which spine is a spicule of the juvenile shell just where it is becoming contracted.

If this deduction prove correct, and I have no doubt about it, probably all the species belonging to the group *Cadulus dentalinus* represent only immature stages of species in the *C. acuminatus* group. This will necessitate a careful re-examination of all these forms, and a considerable revision of their nomenclature.

The radula, which was difficult to get because the animals were dried up, shows a formula of 1.1.1.1.1. Thirteen rows can be counted: possibly there may be a few more in a complete ribbon. The rachidians are higher than wide, narrower at their attached end, where they are widely notched, with a wide, simple, flange-like cusp (pl. xxvi., figs. 1*a*, 1*b*, 1*c*): the laterals are rhomboidal, much larger and stouter, espe

cially at their upper inner part, and are notched at their lower inner angle to form two small cusps. The marginals are not quite so large, are rhomboidal plates, and quite simple in outline. The laterals are very different from the rather remarkably shaped denticles of *C. propinqua*, figured in Man. of Conchology, vol. xvii., pl. xxxix., fig. 11.

Leiopyrga octona, *Tate.*

Trans. Roy. Soc., S. Aust., vol. xiv., 1891, part ii., p. 260, pl. xi., fig. 5.

Dredging has supplied some living examples of this species, from which the operculum and radula have been obtained. The operculum (pl. xxvi., fig. 15) is horny and multispiral, five or six revolutions, with central nucleus. To the margin of the spirals is attached a thin membrane, rather less than half as wide as the spiral. It is radially striated with slightly wavy lines. From the earlier whorls it is absent, doubtless worn away, and is fragmentary and ragged on the next to the last whorl. The radula (pl. xxvi., figs. 16, 17, 18) has for its formula ∞′ (5·1·5) ∞ . As the examples had been allowed to dry instead of being preserved in spirit, the radula was difficult to isolate, and not in perfect condition. There is a rachidian tooth nearly circular or quadrate, with a slight central projection of the free edge. Then follow five laterals on each side, with a thickened outer border, and with the free upper margin bent over throughout its whole extent. These eleven central denticles have no serrations. Then follow short, stout uncini, which gradually become longer and narrower, and finally are subulate. The number of these marginals is indefinite. They have about half a dozen minute serrations near their free end. These are not shown in fig. 18, though seen in fig. 17.

The operculum and radula of this species determine its location in the *Trochidæ*, and not in the *Turbinidæ*, and close to *Bankivia*. Fischer, Manuel de Conch., 1887, p. 810, places "*Liopyrga*" as a genus provisionally in the vicinity of *Phasianella* with the remark, "the operculum is unknown." Pilsbry, in Manual of Conchology, vol. xi., p. 10, 1889, makes it a section of *Bankivia*, and at p. 139 refers to "the thin, membranaceous *Trochus*-like operculum" and "the teeth like those of *Margarita*," in Watson's description of the animal of *L. picturata*, H. & A. Adams. Our species has the same characters and should have the same place. It is quite possible it should have the same name. Tate diagnoses *L. octona* from *L. picturata* by three features: its conspicuous cinguli, its convex whorls, and its linear suture. But its cinguli vary in validity; in some examples they are valid in

all the spire whorls, in others the upper whorls show them plainly, but the lower whorls very indistinctly, though in the latter they are very valid over the base of the body whorl. In some *L. picturata*, from Port Jackson, sent to me by Dr. Cox, there are quite distinct indications of spiral cinguli on the spire whorls, though in most they are wanting. Our shells vary much in the convexity of their whorls. Some with well-marked cinguli are typically convex, others equally cingulated are almost straight-sided, whereas samples of *L. picturata*, from Port Jackson, may be convex. I am disposed to think Tate's species is no more than a validly spirally striate variety of *L. picturata*, Adams.

The colouration of our shell is just as variable as that of *Bankivia fasciata*, Menke. It may be wholly white, or purple, or may be banded or spotted or flamed or blotched, or zig-zagged with pink, brown, or yellow, in very pretty and abundant variety.

Hab.—Dredged in Investigator Strait, St. Vincent Gulf, Backstairs Passage, and off Newland Head; 15 fathoms, 3 dead; 17 fathoms, 8 alive, 9 dead; 20 fathoms, 10 dead; 22 fathoms, 2 recent, 42 dead.

Cassidea sinuosa, *sp. nov.* Pl xxvi., figs. 7, 8, 9, 10*a*, *b*, *c*.

Shell roundly oval, thin. Nucleus of two and a half whorls, smooth, flatly rounded. Spire whorls, three, rounded, with spiral liræ, 13 in the penultimate: the posterior three are linear and adjacent, the next three flatly rounded; interspaces, at first equal in width to liræ, but becoming gradually narrower, till reduced to shallow, wide incisions. Oblique accremental growth lines, crossing liræ and interspaces. Suture linear, finely crenulate. Body whorl large. Suture linear, faintly channelled towards the aperture, where it slightly ascends. Sculptured with flat, broad, slightly raised liræ, least marked over the centre of the whorl; becoming gradually more valid towards the suture, and most valid anteriorly above the notch. Numerous subdistant, axial, accremental striæ, crenulating the suture, more valid and crowded towards the aperture. Aperture obliquely oval, widened anteriorly, compressed for about three millimetres posteriorly. Outer lip sinuous, projecting for about four millimetres below the suture, then receding in a shallow curve to the notch; slightly bevelled within, and faintly toothed. Some callus thickening inside the posterior projection, which is slightly incurved. Columella moderately arcuate, numerous oblique wrinkles on the lower half. Inner lip spread thickly over the varix of the notch, forming a small rhima above and below it, thinly but widely spread over the body

whorl to meet the outer lip. Notch well marked. Ornament, five spiral rows of quadrate rufous spots, one immediately below the suture, and one just above the notch, from eight to ten spots in each row. Length, 24 millimetres; breadth, 15; aperture, 16 by 7.

Hab.—Dredged in Investigator Strait, Backstairs Passage, and off Point Marsden, Kangaroo Island; in 15, 16, 17, 19, and 20 fathoms; 22 individuals, young and mature, alive and dead.

Diagnosis.—From *Cassis pila*, Reeve. It is more ovate, much less globular, and has no varix on the outer lip, which is sharp and peculiarly sinuous. From *C. Adcocki*, Sowerby. It is more elongate, has no longitudinal plicæ, the whorls are not angulated nor concave below the suture, there is no thick, granulated, infra-sutural band, there are no nodules on the last whorl, the labrum is not thickened, but is sinuous. It is not represented in the British Museum.

Its radula shows a single rachidian tooth, with a long, central cusp, and six gradually decreasing cusps on each side; a long lateral tooth, with about thirteen cusps, sloping obliquely inwards, and two uncini, not quite equal in size.

Variety A.—Is slightly narrower, being 19 mm. by 11, instead of 12. In place of five rows of rufous spots there are oblique, wavy, or curved brown radial bands, starting from a row of spots below the suture.

Obs.—The largest specimen is 27·5 mm. in length. When mature or senile there is a marginal linear thickening outside the labrum, which becomes well bevelled inside. In living specimens the ground tint is light pinkish brown, deeper on the nucleus and the earlier whorls. The number of spots in a spiral row varies considerably, even in the same shell, from 7 to 15.

Cancellaria pergradata. *sp. nov.* Pl. xxvi., fig. 19.

Shell small, solid, brown, fusiform. Nucleus prominent, one turn and a half, apex imbedded, smooth, light horn colour. Spire whorls, three and a half, sharply angled. Behind the angle tabulate, with one tuberculate spiral lira. At the angle a stout spiral cord, coronate with about 25 sharp tubercles. Penultimate, with four very valid spiral ribs, not quite equal in width to the interspaces (which are as deep as wide), validly tuberculate, by narrow axial striæ, running from suture to suture, very obliquely from posterior suture to angle.

Body whorl, obliquely roundly pyramidal, with ten spiral cords rounded, about half as wide as the interspaces, crossed by 26 axial lamellæ, which form rounded tubercles at the junction, and coronate the stouter cord at the angle. Finer microscopic axial striæ cross the interspaces between the lamellæ.

Aperture obliquely oblong, narrowed and deviated to the left anteriorly, where it ends in a moderate-sized notch. Posteriorly square, external lip simple, thin, corrugated by the spiral ribs, uniformly slightly curved. Columella nearly straight, with two oblique anterior plates, inner lip as a thin glaze, not obliterating the spiral ribs on the base of the whorl.

Colour, uniform dark chestnut-brown.

Length, 10 millimetres; breadth, 5. Aperture length, 4·5 mm.; width, 3.

Hab.—St. Vincent Gulf, 17 fathoms, 2 broken, 1 recent; Backstairs Passage, 17 fathoms, 1 alive, 3 dead; 22 fathoms, 2 dead.

Stephopoma nucleogranosum, *sp. nov.* Pl. xxvi., figs. 11, 12, 13.

Shell attached, solitary, or conglomerate. Nucleus horn-coloured or white; nautiloid, of one turn and a half; diaphanous, slightly effuse at its aperture; covered with minute granules, arranged in crowded lines corresponding with the accremental lines. The shell springs from within the slightly trumpet-shaped mouth, which projects all round and marks off the embryonic shell from the next whorl. Two and a half of these follow in the same plane, rather rapidly enlarging, and attached to the surface on which the shell rests; then come one or two whorls, coiled above and adhering to those below; and, finally, a free, more or less twisted tube, varying up to an inch in length. The attached whorls along their outer under surface throw out numerous scales of attachment at irregular intervals. The adherent whorls have a pronounced rounded carina along their upper outer part, which gradually becomes less valid along the free tube, until it may be indistinguishable. From this carina the side is flat to the carina of the whorl below, so that a young shell has the shape of a short cylinder fixed by one end on the rock, etc. There are moderately developed accremental striæ, which become ruder and rounder on the free tube.

Aperture circular, or very slightly elliptical.

Colour translucent white. Some are tinged more or less with pinkish-chestnut.

Operculum horny, multispiral: nucleus central, setigerous. Setæ comparatively narrow beyond the base of attachment,

then flatly expanded with numerous (perhaps eight) fine setæ on either side, beyond these the seta bifurcates; one part continues nearly in the same axis, and is the larger and longer; the other stands out at an acute angle and generally divides into two. Resting on the operculum, in the throat of the shell, may be three or four embryos, like minute nautilus.

Cylindrical portion about 6 millimetres in diameter and 4 or 5 high; aperture 3 or 4 in diameter.

Hab.—Backstairs Passage, from 16 to 23 fathoms, many alive.

I compared this species with a solitary small specimen in the British Museum, of unknown habitat, said to be a type of *Vermetus senticosus*, Mörch, and regarded it as identical. But a comparison of the nucleus of our shell with the description and figure of the type of Mörch's shell, given in P.Z.S., 1861, p. 150, pl. xxv., figs. 2 and 14, disproves this. The few large tubercles of his figure are quite different from the numerous minute granules of ours, and the 25 valid mammillæ at the periphery are wanting in ours. Then the form of the opercular setæ is quite dissimilar. Ours has not the expanded, sub-basal lamina he depicts, nor has his the bifurcation which ours always shows. His description indicates his possession of several shells, and not one only. Possibly the British Museum specimen may not have been the actual individual taken as the type, though resembling it externally, but may be the species now described.

Nacella crebrestriata, *sp. nov.* Pl. xxvi., figs. 20, 21.

Shell oblong-ovate, laterally compressed, depressed conic. Apex subcentral, somewhat anterior: rounded, simple. About sixty radial riblets, rounded, about as wide as the interspaces; fine microscopic accremental striæ. Translucent, with an opaque, white apex, and a white flame in the centre of the upper half of the steep anterior slope: on the posterior slope, in its upper half, is a series of about seven opaque, white, concentric markings, consecutively increasing in transverse extent. The muscle scar is open towards the shorter end of the shell. Length, 3·8 millimetres; breadth, 2·1; height, 1·8; apex, 1·1 and 2·7 from the margin.

Hab.—"South Australia," from Professor Tate's collection; no more exact locality given. He had labelled it *Scutellina*; but that genus has the apex directed away from the opening of the muscle scar. Its size and shape recall our *Nacella parva*, Angas, from which it differs in being more solid and in its radial striation.

EXPLANATION OF PLATE XXVI.

Fig. 1*a*. *Cadulus acuminatus*, Tate, rachidian, from the back.
Fig. 1*b*. *Cadulus acuminatus*, Tate, rachidian, from the front.
Fig. 1*c*. *Cadulus acuminatus*, Tate, rachidians, side view; diagrammatic.
Fig. 2. *Cadulus acuminatus*, Tate, lateral.
Fig. 3. *Cadulus acuminatus*, Tate, marginal.
Fig. 4. *Cadulus acuminatus*, Tate, young.
Fig. 5. *Cadulus acuminatus*, Tate, adult.
Fig. 6. *Cadulus acuminatus*, Tate, adult, turned round.
Fig. 7. *Cassidea sinuosa*, Verco, profile.
Fig. 8. *Cassidea sinuosa*, Verco, ventral view.
Fig. 9. *Cassidea sinuosa*, Verco, protoconch.
Fig. 10*a*. *Cassidea sinuosa*, Verco, marginals.
Fig. 10*b*. *Cassidea sinuosa*, Verco, lateral.
Fig. 10*c*. *Cassidea sinuosa*, Verco, rachidian.
Fig. 11. *Stephopoma nucleogranosum*, Verco, adult.
Fig. 12. *Stephopoma nucleogranosum*, Verco, young.
Fig. 13. *Stephopoma nucleogranosum*, setæ from operculum.
Fig. 14*a*. *Dentalium intercalatum*, Gould, var. *Bednalli*, Pilsbry, lateral.
Fig. 14*b*. *Dentalium intercalatum*, Gould, var. *Bednalli*, Pilsbry, rachidian.
Fig. 14*c*. *Dentalium intercalatum*, Gould, var. *Bednalli*, Pilsbry, marginal.
Fig. 14*d*. *Dentalium intercalatum*, Gould, var. *Bednalli*, Pilsbry, accessory plate.
Fig. 15. *Liopyrga octona*, Tate, operculum. *a.a.* Marginal fringe. *b.b.* Spirals.
Fig. 16. *Liopyrga octona*, Tate, rachidian and laterals, one side.
Fig. 17. *Liopyrga octona*, Tate, last marginal.
Fig. 18. *Liopyrga octona*, Tate, first marginal.
Fig. 19. *Cancellaria pergradata*, Verco.
Fig. 20. *Nacella crebrestriata*, Verco, side view.
Fig. 21. *Nacella crebrestriata*, Verco, dorsal view.

NOTES ON SOUTH AUSTRALIAN DECAPOD CRUSTACEA. PART I.

By W. H. BAKER.

[Read July 5, 1904.]

PLATES XXVII. TO XXXI.

In presenting a first paper of a series of studies of South Australian *Decapoda*—a department of our natural history that has heretofore been much neglected—I wish to acknowledge the kind assistance of the President of the Royal Society of South Australia, who has allowed me the use of the specimens from his dredging excursions; Professor Stirling, F.R.S., and Mr. Zietz, F.L.S., of the Adelaide Museum; also of Mr. S. W. Fulton, of Melbourne, who is studying the same branch, and whose help I much appreciate; and also of Mr. G. M. Thomson, F.L.S., of Dunedin, who has been good enough to look through the pages and make some necessary corrections.

In the Proceedings of the Zoological Society, London, for 1863, appear descriptions and figures of a group of shrimps from South Australian waters, by the late Mr. Spence Bate; these were dredged, he says, in about four fathoms, in St. Vincent Gulf by Mr. Angas, and were forwarded by him to the British Museum. The first mentioned is a remarkably beautifully coloured species, *Angasia paronina*, which Mr. Angas himself has figured and coloured, and Mr. Bate states that the genus *Angasia* was instituted by Mr. White, of the British Museum, to receive it.

Since this record I am able to find mention of the following species which have been referred to the same genus, viz.:—

A. lanceolata, Stimpson, from Hongkong.

A. carolinensis, Kingsley, from the east coast of the United States.

A. Stimpsoni, Henderson, from the Gulf of Martaban.

To these I wish now to add four species from our coast which are more differentiated by their external contour than by the details of their structure.

The Rev. T. R. Stebbing, in his "History of Recent Crustacea," remarks at page 233 that "little agreement exists as to the precise classification of some of the genera of the family *Hippolytidæ*"—to which *Angasia* belongs; and Mr. Bate, in his "Macrura of the Challenger," sets out the genera with which he is there engaged as chiefly differentiated by the condition of the mandibles and the number of joints into which the carpus of the second pair of legs is divided.

According to this classification the genus *Angasia* would come in between the genera *Latreutes* and *Hippolyte*, for in it the mandible is without appendage, and the carpus of the second pereiopod is three-jointed, a like condition to what obtains in *Latreutes*, and the question would arise: Why not unite the two genera? The reply must be that they differ sufficiently in other respects to warrant the separation.

There is no doubt that the family greatly requires revision, and if the addition of a few more species renders this more imperative, good will be accomplished.

Sub-order, MACRURA.
Tribe, CARIDEA.

Family, HIPPOLYTIDÆ. (Legion, POLYCARPINEA.)
Genus **Angasia**, *White.*

Body usually elongate.

Carapace without a spine on the gastric region, and without supra-orbital spines.

The rostrum usually is very long, laterally ridged, pointed rigid, tapering, and strongly keeled below, with spines only on the under side.

The antennules are much shorter than the rostrum, and usually shorter than the antennal scales.

The antennal scales also are shorter than the rostrum, long, narrow, robust, regularly tapering to a terminal spine.

The mandibles consist only of the molar process.

The third maxillipeds are short, spatuliform, with the terminal joint short, and strongly spined on its anterior border without exopod.

The second pereiopods have a triarticulate carpus.

The branchiæ are five.

This genus differs from *Latreutes*, in the more elongate form, the shape of the rostrum, in the shape and proportionate length of the joints of the third maxillipeds, and in the proportionate lengths of the carpal joints of the second pereiopods, and in the pleura of the pleon and other minor characters.

Angasia elongata, *n. sp.* Pl. xxvii., figs. 1-4.

Body very elongate, narrow in the vertical direction, especially anteriorly, and laterally compressed.

Carapace more than one-third the length of the body, exclusive of rostrum and telson, about as long as the first four segments of the pleon, smooth, not markedly depressed anteriorly, its anterior margins have rather long subocular spines with slight lobes just above them, the external angles

also are strongly spined and lie posterior to the subocular at the lower level.

The pleon is very slightly geniculate at the third segment. The first five segments do not differ much in dorsal length except the first, which is shortest, and their sides are not very deeply produced, that of the fifth is produced posteriorly well along the sixth—in some specimens nearly its whole length—and there is a small spine on its posterior descending border. The sixth segment is much longer than the dorsal portion of the fifth, its posterior margin bears a lobed spine projecting over the base of the telson on each side, and the posterior angles also are very acute.

The telson is slightly longer than the sixth segment, narrow, arched, and tapering with the usual four quadrately placed spines, which are placed rather low down; it terminates with six strong spines, two of which are small and median, one above the other, the next two outer and longer, the external two short.

The rostrum is rather more than one and a half times as long as the carapace, straight or slightly curved upwards, gradually tapering, with its base occupying the whole of the interocular space, having a dorsal and two lateral ridges; deeply carinate below, especially at the proximal end, with numerous spiniform teeth which decrease in frequency forwards, but do not reach near to the apex. Between the teeth there are soft hairs. (Three specimens had respectively sixteen, eighteen, and over thirty teeth.)

The ophthalmopods are rather short, they are pyriform, and capable of being partially covered by the lateral ridges of the rostrum.

The antennules are short and partially obscured by the lateral ridges of the rostrum. The peduncle does not reach half the length of the antennal scale, the first joint is excavate above to receive the ophthalmopod, the stylocerite spine reaches a little beyond its end, the second joint is longer than the third, and together they are about as long as the first joint. The upper flagellum is thickish and shorter than the peduncle, the lower one slender and longer, but does not reach to the end of the antennal scale. The antennal scales are very long, narrow, rigid, and taper to acute terminal teeth. The second peduncular joint of the antenna has a strong external spine at the base of the scale, and the remaining joints are only about one-fifth the length of the scale. The flagellum is slender and long.

The third maxillipeds are short, only reaching a little beyond the anterior angles of the carapace. The first of the three joints of the endopod is long and a little curved, or twisted proximally, the second very short, the third is

short but longer than the second, moderately broad, strongly setose, wedge-shaped in a side view, its distal margin furnished with seven strong teeth, the apical one stronger than the rest. The first pair of pereiopods are short, moderately robust, not reaching as far as the third maxillipeds. The merus is a little longer than the carpus and is scarcely excavate at its distal end, the carpus is cup-shaped, and distally hollowed to receive the rounded proximal end of the propodus; it bears above a small process tipped with hairs and a little row of setæ near its distal end on the inner side, the palm is a little longer than the carpus, and is articulate to it at its lower edge, it tapers somewhat and is slightly curved, its proximal end is rather swollen above. The fingers are setose, excavate, rather weak, much shorter than the palm, with terminal curved teeth. The second pair of pereiopods are very slender, weakly chelate, reaching as far as the first pair. The ischium and merus are subequal in length, the carpus longer, it widens a little distally, and its third division is subequal to the first, the middle one being short; the propodus narrows distally and is slightly curved. It is a little longer than the third division of the carpus, the fingers are very weak and setose at their tips.

The third and fourth pairs of pereiopods are rather long, moderately robust, reaching further forward than the maxillipeds, the meri are long, and are provided each with a distal spine below. The carpi are a little produced distally above, the propodi are more than twice as long as the carpi, they are a little compressed, and narrow somewhat distally and are moderately spinose behind, the dactyli are slightly curved, strong, and terminally bifid, with a few strong spines towards the proximal ends. The fifth pair are shorter, but otherwise similar. The pleopods are long and well developed in both sexes.

The uropods are a little longer than the telson, they are narrow, the rami are nearly equal in size and well developed, the outer ramus has a sinuate division and two subterminal spines on the outer side.

Length of carapace, 15 mm.

Length of pleon, 25 mm.

Length of rostrum, 22 mm.

Length of antennal scale, 8 mm.

Dredged by Dr. Verco, about fifteen fathoms, S.A. coast; also specimens from Port Victor from Mr. Pullein.

Types in the Adelaide Museum.

Angasia kimberi, *n. sp.* Pl. xxvii., fig. 5.

Body arched, much compressed laterally, elongate, moderately slender, tapering anteriorly and posteriorly from the

third segment of the pleon. Carapace nearly one-third the length of the body, excluding rostrum and telson, dorsally depressed from near the posterior end forward, anterior margin as in the preceding species.

The pleon is shaped differently from that of the preceding species, the pleura are deeper, and it is more geniculate at the third segment, the fifth segment is well produced posteriorly to about half the length of the sixth, and bears a spine on the oblique posterior margin; the sixth segment is also similarly spined as in *A. elongata*, and is about twice as long as the dorsal portion of the fifth. The fifth segment is a little longer than the first, the third and fourth and second and fifth subequal in length.

The telson is unfortunately broken.

The rostrum is very long (also broken in specimen), much longer than the antennal scales in the same oblique line with the anterior part of the carapace, it is dorsally and laterally ridged, the teeth on the lower carina are numerous and rather crowded.

The ophthalmopods are as in *A. elongata*, as also are the rest of the appendages in most of their parts.

The second pereiopods have the carpus equal in length to the merus, of its three joints the third is longer than the first.

Length, excluding rostrum and telson, 37 mm.

This species differs from the preceding in the more laterally compressed and rather less slender and tapering body, the arched shape, and somewhat deeper pleon segments, and in the depressed carapace; it is also like *A. pavonina*, but differs specifically in the elongate, many toothed rostrum, and the shape of the first and second pereiopods.

Dredged by Mr. W. J. Kimber in about four fathoms, off Port Willunga.

Type, one female, in Adelaide Museum.

Angasia robusta, *n. sp.* Pl. xxviii., figs. 1-8.

Body robust, smooth, moderately elongate.

Carapace not depressed as in *A. kimberi*, spined anteriorly as in the same, also bearing about the same relation in length.

The rostrum is only a little longer than the carapace, it is very strong, slightly curved upwards, and tapers to a point, it has dorsal and lateral ridges, which are very pronounced, and a deep carina below, provided with five to seven small, remote teeth.

The ophthalmopods are not so pyriform as in the preceding species.

The stylocerite spine of the antennular peduncle is strong and extended beyond the first joint, the second and third joints are subequal in length, the upper flagellum is short, about equal in length to the second and third joints of the peduncle together, the whole scarcely half the length of the antennal scale; the lower flagellum is very slender, and a little longer than the upper.

The antennal scale is long, reaching about three-fourths the length of the rostrum, rigid, narrow, tapering, the external spine on the second joint of the peduncle is not very acute, the remainder of the peduncle is only about one-sixth the length of the scale, the flagellum is nearly as long as the body of the animal.

The third maxillipeds are very robust, reaching a little further than the anterior angle of the carapace, the terminal joint is very broad at the end, and is provided with 11-13 strong, but short, teeth, six or seven of which are on the inner margin.

The first pair of pereiopods are scarcely different from those of the preceding species, except that the propodus is not so swollen above at the proximal end, and the joints are comparatively a little longer.

The second pereiopods are long, slender, and reach forward a little beyond the maxillipeds. The merus is a little shorter than the carpus, the first and third carpal divisions are subequal. The ischium of this joint is marked with two small spines, which are close together and on the inner side.

In the third, fourth, and fifth pairs the carpal joints and the dactyli are longer than in the preceding species.

The pleon is moderately geniculate at the third segment. The first segment is the shortest, the third more than twice as long as the first, the second and fifth are subequal in length, and the fourth a little longer, the sixth is not much longer than the fifth, the pleura of the segments are very deeply produced, almost covering the peduncles of the pleopods in the females: their posterior angles are scarcely rounded or abrupt, the posterior oblique margin of the fifth is without spine, and is produced much deeper than the sixth segment, the postero-lateral margin of the sixth segment has a large lobe, tipped with a small spine projecting over the base of the telson.

The telson is longer than the sixth segment of the pleon, it narrows quickly, tapering to end in four spines, the two inner ones longer. The uropods are longer than the telson, the outer ramus is well thickened on the external margin.

Length, excluding rostrum and telson, 38 mm.

Length of carapace, 13 mm.

Length of rostrum, 16 mm.

Length of antennal scale, 12 mm.

The general appearance of this species is well differentiated from the two preceding; from *A. pavonina* it differs first in its greater robustness, secondly in the shape of the rostrum and its number of teeth, thirdly in the comparative length of the joints of the first pair of pereiopods, fourthly in the shape of the second pereiopods, which do not expand distally to such a degree, and fifthly in the circumstance that the telson ends in four spines.

Dredged in from 10-12 fathoms, St. Vincent Gulf.

Types in the Adelaide Museum.

Angasia tomentosa, *n. sp.* Pl. xxix., figs. 1-4.

Body less elongate than in each of the preceding species, rather robust, covered on all parts with a harsh tomentum.

Carapace nearly as long as the first four segments of the pleon, a little elevated dorsally, anteriorly descending obliquely to the rostrum, deepening behind, the anterior margin has two small, subocular spines close together, the lower one more acute, the antero-lateral angle has a larger spine which projects further forward than the suboculars.

The pleon is very slightly geniculated at the third segment. The first five segments are dorsally carinate, the carinæ of the third, fourth, and fifth are posteriorly produced to spines, the sixth segment, although the longest, is comparatively short, it is without carina, its postero-lateral margin bears a long, lobed spine projecting over the base of the telson, and there is a small one at the posterior angle: the posterior margins of the segments are well rounded below, and the fifth has a spine on the oblique margin and another small one below it at the angle.

The telson is much longer than the sixth segment of the pleon, it is arched above, narrow, with two strong terminal spines, with a very small median tooth between them, it narrows rather more abruptly near the end, there is one small spine on each margin just above the end, and above them near the point of greater contraction one on each side, also marginal. These may be the representatives of the usual, quadrately placed spines, but they are not in the usual positions.

The rostrum is rigid, as long as the carapace, it is a little elevated distally and tapers to an acute point, its dorsal and lateral ridges are well marked, especially the latter, which extend for a short distance behind the orbits: on each side of the dorsal ridge there is a slight groove, a strong keel below bears five teeth, the more distal ones very remote; it is scantily setose between the teeth.

The ophthalmopods are rather short and thick.

The antennules are short; the peduncle is about one-fourth the length of the rostrum, the first joint is excavate above, its stylocerite spine being very strong and reaching well in advance of the end of the joint, the second and third joints are subequal in length, rather swollen above, together they are shorter than the ophthalmopod, the upper flagellum reaches rather more than half the length of the antennal scale, the lower one is a little longer than the scale.

The antennal scale reaches about two-thirds the length of the rostrum, it is broader than is usual in the other species, and is strengthened by two longitudinal ridges above, the distal spine is terminal, the external spine on the second joint of the peduncle is strong, and above it at the base of the scale there is an acute projection. The remaining joints of the peduncle are nearly one-fourth the length of the scale. The flagellum is slender and long.

The third maxillipeds reach nearly to the end of the antennal peduncle, of the three joints, the distal portion of the first, the second, and third are slightly excavated on their upper expanded surfaces, the third joint is acuminate distally, with a strong terminal spine, four others on the outer side and two or three on the inner; between the spines are very short teeth, the joint also along with the second is strongly setose on the inner side.

The first pereiopods resemble those of *A. robusta*, as also do the second, except a peculiar bend at the junction of the basis joint with the ischium, and there is only one spine on the ischium.

The third and fourth pairs are robust and long, the meri bear two spines below near the distal end, and are fringed with plumose setæ, the carpi are short and expand well distally, the propodi taper a little and are well spined on their posterior margins, the dactyli are short, little curved, and have two strong claws.

The fifth pair are rather less robust, the merus having only one spine. The pleopods are well developed, the rami subequal in length.

The uropods are rather narrow, as long as the telson.

The ova are small and numerous.

Length, excluding rostrum and telson, 28 mm.

Length of carapace, 13 mm.

Dredged by Dr. Verco, S.A. coast, about 20 fathoms.

Types, two, in Adelaide Museum.

Another species obtained belongs to the genus *Alope*, of the family *Hippolytidæ*, and is related to a species, *Alope palpalis*, White, which is figured in the zoology of the Erebus and Terror, Crust., pl. iv., fig. 1, and for a long time was imperfectly known until recently redescribed by Mr. G. M.

Thomson, of Dunedin, in Trans. Lin. Soc., 2nd series, vol. viii., pt. ii.

The present species differs from *A. palpalis* mainly in its smaller size, its non-expanded carapace, its less robust third maxillipeds, in the less divided state of the second pereiopods —except the carpus—and in many other minor particulars.

I am not aware of there being known any other species of this genus, so I take the liberty of slightly modifying Mr. Thomson's presentation to include the present species.

Tribe, CARIDEA.

Family, HIPPOLYTIDÆ.

Genus, **Alope**, *White*, 1847.

Carapace smooth, with supra-orbital spines and suborbital teeth.

Rostrum short, armed with teeth above and springing from a deep groove.

Ophthalmopods short, stout, ocelli well developed.

First antenna short, with two flagella.

Second antenna with large scale (scaphocerite) and long flagellum.

Mandible with shortened or almost obsolete cutting plate, and three jointed palpi.

First maxilla two or three branched.

Second maxilla three branched with wide mastigobranchial plate.

First maxilliped with two lobed mastigobranchia.

Second maxilliped with short podobranchial plume.

Third maxilliped very long and pediform, without branchia.

First pereiopod strong, chela well developed.

Second pereiopod slender, long, minutely chelate, carpus seven-jointed.

Telson moderately narrow.

Third to fifth pereiopods with two clawed dactyli.

Pleurobranchiæ, five.

Podobranchia, one, on the second maxilliped.

Alope australis, *n. sp.* Pl. xxx., figs. 1-7.

Body smooth, white, with many very small red spots. short and robust. Carapace not carinated dorsally or swollen, but slightly narrowing anteriorly. The two long, supra-orbital spines are connected dorsally by a U-shaped ridge, in the fork of which is a small, broad-based spine, and immediately in front of this spine in a depression arises ridge, in the fork of which is a small, broad-based spine,

eyes, acute, slightly depressed, with lateral ridges, acuminating on all sides, with five forward directed spines above, entire below, with the apex a little laterally constricted. Laterally from the supraocular spines a ridge is continued on each side in a curved manner to a prominent antennal spine. This ridge forms the posterior margin of a lunate depression (half of the depression which the rostrum divides), and its anterior margin is excavated to receive the eye peduncle. The antero-lateral angles are rounded, and the remainder of the lateral margins of the carapace are fringed with short hair.

The pleon is not carinated or geniculate, it narrows regularly in the transverse direction after the second segment. The pleura of the three anterior segments are moderately deep, those of the first overlapping the carapace, those of the second the first and third, though not extensively. The sixth segment is shorter than the two preceding ones together, and about as long dorsally as the third: on its posterior margin it bears two triangular spines, which project each side of the telson, the posterior angles are acute, but do not project as far as the above spines, the sternal surface has an obtuse preanal lobe.

The antennular peduncle reaches to about the middle of the antennal scale, the basal joint is much expanded and excavate above, and reaches well beyond the eyes, the stylocerite spine, which is not deeply cut from the body of the joint, reaches a little beyond the end, there is a small lobe at the inner proximal end, and a tuft of plumose setæ near the distal end above, the second and third joints are subequal in length, and are together shorter than the first, each three joints has distally and above a little transverse comb of short spines and below the first and second bear tufts of plumose setæ, the upper flagellum is stout, and subequal in length to the peduncle, the lower is slender and about twice as long. The ophthalmopods are stout and short, ocelli join the pigmented portion above.

The antennæ have moderately broad scales, which only slightly narrow distally. The external distal spine is well below the apex, there is a small external spine on the outer side of the second joint of the peduncle, and a group of plumose setæ on the third joint on the inner side, the fifth joint has distally a tuft of rather rigid plumose setæ, this joint reaches about two-thirds the length of the scale, the flagellum is strong, and nearly as long as the animal's body.

In the mandible the cutting plate is extremely rudimentary: the molar process is strong and very deflexed, there is a three-jointed palp, the basal joint of which is expanded and produced at the outer angle.

The first maxilla is three-lobed, the outer branch bifid, with one or two long setæ on each division.

In the second maxillipeds the exopod is very large, the last two joints of the five-jointed endopod deflexed.

In the third maxillipeds the endopod is very long, reaching forwards as far as the lower flagellum of the antennule, the three joints are well beset with hairs. The first joint is longer than the third, the second about one-third the length of the third, the third is more vertically compressed, slightly curved and a little tapering, very hairy on the inner side, as also is the second, with four or five strong, divergent spines at the end. The exopod is very small.

The first pereiopods are moderately strong. Both merus and carpus are distally excavate to receive prominences of the succeeding joints, which are articulated at their inner proximal angles. The palm is smooth and scarcely compressed, with a slight longitudinal sulcation on the inner side, the fingers are a little more than half as long as the palm, they are curved and are distally cut into two or three corneous teeth, and are setose on their apices and margins, and excavate, the carpus and palm together are subequal in length to the ischium and merus together. The merus has a row of small teeth at the outer distal end, and the margin of the cup-like carpus has—besides the shallow one at the articulation of the palm—two deep insinuations near the margin, on the inner side there is a row of pectinate setæ.

The second pereiopods are long and slender. The carpal joint is divided into seven, the first four become successively shorter, the fourth, fifth, and sixth are subequal in length, the seventh about as long as the third, the palm is a little longer than the seventh division of the carpus, the fingers are half as long as the palm, the ischium and merus together are subequal in length to the succeeding joints together, the merus is a little longer than the ischium, and together they form a slight curve. The end of the last joint of the carpus has a pencil of long bristles, and some are situated on the fingers.

The following three pairs of pereiopods are moderately stout, the last pair a little weaker, they are sparely spined, the ischi and meri together are stouter and subequal in length to the succeeding joints, the carpi are slightly curved, the propodi slightly compressed and a little curved; the dactyli are strong, curved, with two strong claws, and a few spines inward from them.

The pleopods are well developed, the rami subequal. The uropods have moderately broad rami, the external one has a tooth and articulated spine, with a sinuate division somewhat distant from the end, the outer margin is straight.

The inner ramus is ovate-lanceolate and as long as the outer both are elegantly fringed. The telson is shorter than the uropods, tapering, with a shallow median sulcation and the usual quadrately placed spines, and a fasciculus of setæ near the proximal end above; it terminates in five teeth and two spines, and is fringed to about halfway up the sides.

The ova are small and numerous.

Length from base of rostrum to base of telson, 27 mm.

Length of carapace, 10 mm.

Obtained in shallow water at Smith's Bay, Kangaroo Island, by R. Baker, January, 1903.

Type specimens, two, in Adelaide Museum.

A sixth species is unique; a female found by Mr. Zietz amongst Dr. Verco's dredgings from 20-30 fathoms. It belongs to the family *Crangonidæ*, of the same tribe as the preceding, and is related to both the genera *Pontophilus* and *Sabinea*, with tendencies towards *Pontocaris*, but I am of opinion that it requires to be placed in a new genus, mainly for the following reasons:—First, the shape of the body and the relationship of the parts, though the cephalo-thorax is not so long, it is quite as bulky as the pleon; secondly, the peculiar position of the eyes, their distance apart and sessile character; thirdly, though the second pereiopods are reduced in length and non-chelate, they are still comparatively strong, and reach as far as the carpus of the first pair; fourthly, the telson is broad and more *Alpheus*-like than in any figures of other species of the same family I have seen; unfortunately, I am not able to state whether the branchiæ are six or seven.

Tribe, CARIDEA.

Family, CRANGONIDÆ.

Genus, **Vercoia**, *n. gen.*

Body short.

Carapace deep, as long as the first four segments of the pleon, little compressed laterally, broad, produced at the antero-lateral angles, its lower margin making an obtuse angle about the middle.

Eyes distant, large, on very short peduncles, which are hidden by the cephalic portion of the carapace, in distinct orbits formed above by that portion of the carapace and below by the produced antero-lateral regions, and anteriorly by processes of the antennules.

Rostrum shaped as is usual in *Pontophilus*, placed far in advance of the eyes.

Antennular peduncles very short, much hidden by the cephalo-thorax, the joints with external lateral expansions, that of the first completing the orbit in front.

Antennal scales short, feeble, subtriangular, without distal spines, flagella short.

Third maxillipeds long, the distal joints vertically compressed.

First pereiopods robust.

Second pereiopods non-chelate, shortened but rather robust, reaching as far as the carpal joints of the first, carpus and propodus together about as long as the merus.

Third pereiopods styliform.

The pleopods have much expanded peduncles, which become faced outwards in the female, the rami are curved, especially the inner.

The uropods and telson are short, the telson broad, rounded at the end, and ciliate, but not spined.

There is a ridge on the ventral surface between the first and second pairs of pereiopods, terminating anteriorly in a projecting spine between the first pair.

Vercoia gibbosa, *n. sp.* Pl. xxxi., figs. 1-4.

Body short, very much depressed at the first segment of the pleon, gibbous and much sculptured with many obtuse prominences, but no spines. Carapace of rigid consistence, deep, dorsal surface broad, rather depressed, consisting of a shield-like platform, which occupies nearly the whole length; this is rather excavate in the gastric region, and anteriorly and medianly bears the short, slightly excavate, and entire rostrum. Laterally from the rostrum on each side is a lobe, slightly insinuated on the margin projecting in front of the eye, and forming the upper anterior part of the orbit. The lateral margin of the platform on each side is marked first by a small tooth immediately over the eye, then by a short, slightly sigmoid, detached ridge, and behind this a short, straight ridge beginning abruptly. The posterior boundary on each side of the median line consists of a small, incurved, oblique ridge, and behind these a pair of longer, converging ridges, forming together a broad V, the apex of which reaches close to the posterior margin of the carapace. The surface of the anterior or gastric portion of this platform is smooth, but the cardiac portion has medianly a longitudinal ridge, divided into three portions—or obtuse carinæ, the most anterior part of which is short and low—not visible from a side view, the second and third portions are strongly elevated, the third being declivous behind towards the posterior margin of the carapace: on each side of the middle portion is a short, transverse, scale-like ridge. The antero-lateral angles of the carapace are produced considerably in advance of the eyes to near the bases of the antennal scales, from them on each side an oblique ridge extends backward and

slightly downward, for about half the length of the carapace, and between this hepatic ridge, which is very pronounced, and the lateral margin is another faintly marked, which bifurcates behind and soon disappears. The lateral margin of the carapace forms an obtuse angle immediately over the base of the third pereiopod. Posterior to these ridges and higher up is another short, oblique ridge, divided into two anteriorly abrupt portions, and higher still and more posterior there is a short, slightly sigmoid ridge, whose end reaches close to the posterior margin of the carapace, and in the postero-lateral region there are two short, slightly oblique ridges with very obtuse anterior ends. These have a few faintly marked, scale-like projections preceding them. The antenal and hepatic regions also have a few short, scale-like projections, viz., one a little below and behind the eye, with two or three more higher up about the middle of the carapace, and one or two on the antennal region.

The pleon narrows considerably after the third segment both laterally and vertically, it is much sculptured, and the second and third segments are strongly humped in the middle line. The first segment is very short, and very slightly overlaps the carapace. The three posterior segments also are short and broadly but not deeply keeled dorsally, they are marked with one or more scale-like ridges on the sides; the second and third are more sculptured above and at the sides than the others, and are only moderately produced at the sides. The sixth segment is longer than either of the two preceding ones, it is much overlapped at the sides by the fifth, and ventrally has a broad, preanal lobe bearing two acute prominences.

The telson is a little longer than the sixth segment, it is rather broad, especially at the base, medianly sulcate above, rounded at the distal end, and ciliate, but not spined, dorsally there are two scales on each side of the median sulcation, occupying the place of the usual quadrately placed spines.

The appendages are mostly short.

The eyes are as stated above.

In the antennules the first joint of the peduncle is hidden under the carapace except its lateral lobe. The peduncle does not extend much further than the rostrum. The upper flagellum does not reach as far as the antennal scale, the lower one is very small.

The antenna arises in a recess of the anterior margin, its scale has a small triangular process situated near its base on the upper surface. The distal peduncular portion is scarcely more than half the length of the scale, the flagellum is slender and very short.

The third maxillipeds project well in advance of the scales of the antennæ, the last two joints are broad and fringed with short setæ. The antepenultimate joint has a short distal keel below.

The first pereiopods are sub-chelate, they are capable of reaching as far forwards as the maxillipeds, the merus is much compressed, the carpus very short, and its distal margin is divided into lobes, the carpus and palm are together about equal in length to the ischium and merus together. The palm is robust, about twice as long as broad, swollen much proximally—on a side view—with a strong spiniform pollex and moderately strong dactylus.

The second pereiopods are short, non-chelate, not very weak, reaching nearly as far as the carpus of the first, the terminal joint is small and acute, the penultimate joint bears a small distal spine in the position of a pollex, the limb is slightly setose.

The third pereiopods are very slender, styliform, with the terminal joint very acute, it reaches forward nearly as far as the antennal scale. The next two pairs of pereiopods are robust, very sparingly setose, with strong, simple dactyli. The four anterior pairs of pleopods are short, with very broad peduncles presented outwards. The rami are curved and foliaceous, the inner ones falcate.

The uropods are short and rather weak, the outer ramus is subtriangular, without a division, and with a very small external spine, the inner ramus is ovate and narrower.

The ova are large and few.

Length, excluding rostrum and telson, 14 mm.

Length of carapace, 6 mm.

Type, one female, in Adelaide Museum.

DESCRIPTIONS OF PLATES.

Plate XXVII.

Fig. 1. *Angasia elongata*, n. sp., enlarged.
Fig. 2. Third maxilliped of same, enlarged.
Fig. 3. First pereiopod of same, enlarged, outer view.
Fig. 4. Second pereiopod of same, enlarged.
Fig. 5. *Angasia kimberi*, n. sp., enlarged.

Plate XXVIII.

Fig. 1. *Angasia robusta*, n. sp., enlarged.
Fig. 2. Third maxilliped of same, enlarged.
Fig. 3. Telson of same, enlarged.
Fig. 4. Opthalmopod, antennule and antennal scale of same, enlarged.
Fig. 5. Rostrum of same, enlarged.
Fig. 6. Mandible of same, enlarged.
Fig. 7. First pereiopod of same, inner view, enlarged.
Fig. 8. Second pereiopod of same, enlarged.

PLATE XXIX.

Fig. 1. *Angasia tomentosa*, n. sp., enlarged.
Fig. 2. Third maxilliped of same, enlarged.
Fig. 3. First pereiopod of same, inner view, enlarged.
Fig. 4. Second pereiopod of same, enlarged.

PLATE XXX.

Fig. 1. *Alope Australis*, n. sp.
Fig. 2. *Alope Australis*, frontal parts of same, much enlarged.
Fig. 3. *Alope Australis*, first pereiopod of same, much enlarged.
Fig. 4. *Alope Australis*, mandible of same, much enlarged.
Fig. 5. *Alope Australis*, under side of antennal peduncle of same, much enlarged.
Fig. 6. *Alope Australis*, second pereiopod of same, enlarged.
Fig. 7. *Alope Australis*, uropods and telson of same, much enlarged.

PLATE XXXI.

Fig. 1. *Vercoia gibbosa*, n. sp., lateral view.
Fig. 2. *Vercoia gibbosa*, dorsal view.
Fig. 3. *Vercoia gibbosa*, frontal parts of same, much enlarged.
Fig. 4. *Vercoia gibbosa*, second pereiopod of same, much enlarged.

DESCRIPTIONS OF SOME NEW SPECIES OF ORTHOPTERA FROM NORTH-WESTERN SOUTH AUSTRALIA.—NO. 1.

By J. G. O. TEPPER, F.L.S., F.S.Sc.

[Read June 7, 1904.]

PLATE XXXII.

The species described form part of a small collection made by Mr. Herb. Basedow, as one of the members of an exploring expedition under the command of Mr. L. A. Wells. This part of the country had been rarely traversed, and no insects had been collected there previously. The expedition left Adelaide in March, 1903, and returned in the following November.

Order, ORTHOPTERA.

Family, BLATTARIÆ.

PERIPLANETA BASEDOWI, *sp. nov.* Plate xxxii. (three females in good condition).

Ochraceous, shining, size large.

Head with impressed minute dots; a round pale spot at the base of the antennæ and separate from them and the eyes; face with faint, dark spots in transverse rows. Antennæ brownish, very slender, as long (or nearly so) as the body. Pronotum transverse, elliptical, with subangular, subsemilunate, brownish impressions. Meso.- and metanotum paler marked; scutellum elongate-triangular, promiscuous. Elytra as long as or longer than the wings, deep black, shining; anal vein and transverse veinlet very fine, pale. Wings much longer than the body, anterior area and the veins of the posterior deep black; transverse veinlets pale, membrane between them greyish. Legs shorter, but stouter than those of *P. americana;* concave surface (under the femora) of the coxæ with small raised granula; femoral spines few and slender; middle and hind femora with about six strong spines in each row; tarsi short, glabrous. Abdomen ovate, compressed, thin, rugulose, with a submarginal row of small, dark spots, hind margins of segments above and beneath broadly darker; posterior angles of penultimate segment alone produced; supra-anal lamina subrotundate, depressed; scarcely twice as long as the lamina; subgenital lamina emarginate, very short and slender.

Length of body, 25-28 mm.
Length of pronotum, 8 mm.
Length of elytra, 30-33 mm.
Length of wings, 25-27 mm.
Width of pronotum, 11-12 mm.

The bright-coloured pronotum and legs contrast most conspicuously with the deep lustrous black tint of the elytra, and render this species the handsomest of the Australian species and of the genus, and I have much pleasure in dedicating it to the assiduous collector as a slight mark of esteem.

MANTODEA.

(?) Pseudomantis pulchellus, *sp. nov.*

Female. Pale brownish grey to pale brown (abdomen). Head transverse, extremely compressed, pale grey; eyes very large, a darker band with parallel borders over the middle, and continued over the ridge of the head; front with three minute tubercles in place of ocelli. Antennæ missing. Prothorax smooth above, very elongate and slender, slightly dilated anteriorly; margin densely and finely spinulose; a narrow pale transverse line before the middle of the dilatation, anterior to which an elongate, gradually attenuated depression extends about halfway towards front margin, posteriorly a distinct median ridge extends continuously to the hind margin of the metanotum. Meso.- and metanotum pale, subequal. Elytra longer than the wings, thinly membranous, pale brownish; fore margin, anal area, and a large round discal spot whitish; apex obtuse. Wings subrotundate, frontal area rosy with brownish apex, remainder opaque, deep bluish black, with a few linear transverse streaks anteriorly; apex brown, with a narrow white border. Forelegs elongate; coxæ unarmed, external keels whitish; femora with four spines externally and numerous spinelets internally; a very long spine followed by two much smaller ones obliquely opposite to the last external; tibiæ multispinulose, and a long spur. Middle and hind legs very long and slender, unarmed. Abdomen subcylindrical, slightly attenuated towards extremity, not dilated; supra-anal lamina triangular, equilateral, subacute; lateral lobes subtriangular, whitish; cerci slender, not, or scarcely, extending beyond the lobes; anal appendages forming two small, acute spines.

Length of body, 52 mm.
Length of head, 1 mm.
Length of pronotum, 13 mm.
Length of elytra, 11·5 mm.
Length of wings, 9 mm.
Length of hind femora, 17 mm.
Width of head, 4 mm.
Width of elytra, 3 mm.
Width of dilatation, 2·75 mm.

It is with some diffidence that I place this species in the genus it is assigned to, it apparently not agreeing exactly

with any I have descriptions of; but not having the male (perhaps akin to *P. Kraussiana*, Sauss.), the creation of a new genus appeared inadvisable. In the form and colouration of elytra and wings it seems to approximate the African genus *Danuria*.

ACRIDIDÆ.

CORYPHISTES CYANOPTEROIDES, *sp. nov.*, 2 (male and female).

Resembles *C. cyanopterus*, Charp., but is darker and larger; dull brownish-grey. Fastigium very prominent, nearly parallel-sided, apex abruptly rounded. Eyes large, dark reddish-brown. Antennæ ensiform, joints gradually diminishing in width from the third. Ocelli inconspicuous, brown. Head with a fine medial ridge from near the apex of the fastigium, and continued to the hind margin of the pronotum; dark lateral parallel-sided bands, bordered above narrowly white, from the inferior part of the eyes, and continued to the hind margin of the pronotum, the space between the bands marbled with black. Elytra pale brown, veins much darker, a few blackish streaks adjoining the base of the humeral and near the middle of the anal vein; transverse veinlets very numerous, mostly pale, but bordered mostly and capriciously deep black or brown. Wings with costal area smoky brown (mas.), or blackish (fem.), veins and veinlets much darker; remainder much paler, basal and anal part pale blue. Fore and middle legs slender, body colour; hind femora strong, base not very tumid, unarmed, inner side wholly black (mas.), or more or less purplish (fem.); hind tibiæ pale greyish externally, remainder rosy-purplish; with two rows of ten spines above, the external ones black and much the larger. Abdomen grey or brown, banded dark brown or blackish (mas. and fem.); cerci conical, very short.

Length of body, 45-47 mm.
Length of antennæ, 14-15 mm.
Length of pronotum, 10-12 mm.
Length of elytra, 48-50 mm.
Length of hind femora, 21-22 mm.
Length of hind tibiæ, 18 mm.

This species is widely distributed in South Australia, and has been usually included under Charpentier's name, *C. cyanopterus*. From this species it differs by the much more prominent and angular fastigium, general colouration, and other characters. It inhabits forests and woods sparingly, and is slow to take to flight. Its colour appears to be highly protective, inasmuch as it agrees more or less perfectly with the tints of the trunks of trees, etc., upon which it rests, or settles when disturbed.

CORYPHISTES SERRATUS, *sp. nov.*

Female. Brown, variegated with grey and black. Head large; eyes oval, metallic golden-bronze. Fastigium wide above, concave, blackish, keeled, emarginate, contracted into a narrow ridge in front below the apex between the antennæ, then again gradually diverging and terminating rotundately beyond the ocellus. Lateral ocelli large, black, midway between the eyes and the antennæ. Occiput, sides and underside of head, also the sternum yellowish-grey; a low median ridge and an impressed, curved black band from the base of the fastigium on either side to the base of the head. Antennæ blackish, apparently with 18 joints; basal joint short, stout; joint 2 still shorter, thinner, cup-shaped; remainder much longer, subcylindrical, gradually diminishing in size to apex; from the third with a broad membranous border, forming alternately larger subtriangular lobes, with rounded hind margin to near the apex. Pronotum black, with numerous pale striæ bordering the fore and hind margins, and pale round granulations scattered over the rest, fore margin emarginate, hindmargin rounded. Elytra pale grey, acute, the extremely numerous longitudinal veins and transverse veinlets bordered dark brown. Wings with basal area tinged pale greenish, shading into brownish along anterior costa and towards apex, costal veins and veinlets dark brown, remainder pale. Legs mottled blackish and brown, fore and median ones short, underside and internally more or less densely pilose, tibiæ with a few minute spinelets along the inner ridge. Hind femora strong, upper ridge minutely spinose, lower ridge with nine larger spines, and hairy between; discal ridges spinulose; internal side smooth, crimson with broad transverse black markings; lower genicular lobes very long, narrowly lunate, as long, or longer than, the width of the joint. Hind tibiæ slender, mottled brown and blackish, inner side black and crimson; external upper ridge with eleven acute conical spines, internal with nine, space between densely pilose; spurs very small. Tarsi thinly hairy; claws oppositely divergent; pulvillus large. Abdomen blackish brown above, pale beneath. Cerci mutilated. One female.

Length of body, 41 mm.

Length of antennæ, 18 mm.

Length of pronotum, 10 mm.

Length of elytra, 50 mm.

Length of wings, 45 mm.

Length of hind femora, 26 mm.

Length of hind tibiæ, 22 mm.

The remarkably and prominently keeled fastigium, broad serrated antennæ, markings of the pronotum, and armature of the hind femora and tibiæ, also the elongated curved genicular lobes, appear to render this a well-marked species, and, perhaps, with the following the type of a subgenus.

CORYPHISTES NIGROCONSPERSUS, *sp. nov.*

Male and female. Smoky brown; in general form resembling preceding. Head pale (mas.) or dark (fem.) brown. Fastigium blackish, subrectangular above, separated from occiput by a more or less distinct furrow; distinctly keeled only towards apex, in front contracted to an obtuse ridge, then expanding between the antennæ forms a distinct callosity, with the ocellus in the central depression, the distinct (mas.) or indistinct (fem.) sinuous lateral ridge extending to the margin of the face. Occiput and sides of head nearly smooth, dull; a narrow black median stripe from base of fastigium to pronotum, a slightly curved, irregularly bounded brownish band on either side above; laterally a broad, parallel-margined black band from the base of the antennæ, interrupted by the lower part of the eyes, and a narrow black submarginal, more irregular one, starting conjointly with the former. Eyes oval, dark bronzy-brown; lateral ocelli rather small, bright brown, adjoining the lower border of an elongate black spot on the side of the fastigium. Antennæ dark brown, mottled paler, ensiform; marginal lamina very thin, basal joint subconical, joint 2 very short, not much thinner than the first; joint 3 over three times longer than the preceding together, triangular, broad; joints 4-7 quadrate, angular, subequal; joints 8-9, 10-11, 12-13 successively narrower, longer than wide, quadrangular; joint 14 half as wide as preceding, remainder gradually diminishing in dimensions, last ones very minute. Pronotum darker than the head, almost smooth, rounded in front and behind, with a few minute tubercles above and two broad pale stripes to posterior transverse furrow, also the black cephalic stripes more or less distinctly continued to the hind margin. Elytra ochreous-brown, with numerous small spots scattered over all; apex obtuse. Wings pale greenish-brown; veins and veinlets dark, not bordered. Legs, also face and underside, more or less beset with brown hairs. Fore and middle legs unarmed. Hind femora stout, as long, or longer than, the body; external genicular lobes moderately long, curved, gradually narrowed to the subacute apex; internal lobes large, subquadrate; external ridges minutely spinose, densely hairy above; discal area white (mas.) or pale ochreous (fem.), with 16 black, narrow,

angulate, transverse bands; internal area blackish and purplish; hind tibiæ with two rows of 9-11 large acute spines, besides 4 curved spurs, space between densely hairy. Tarsi long; claws and pulvilli small. Abdomen stout, smooth, shining, and ending with 6 small black spines.

Length of body—Male, 45 mm.; female, 52 mm.
Length of antennæ—Male, 17 mm.; female, 21 mm.
Length of pronotum—Male, 11 mm.; female, 15 mm.
Length of elytra—Male, 43 mm.; female, 47 mm.
Length of hind femora—Male, 24 mm.; female, 28 mm.
Length of hind tibiæ—Male, 20 mm.; female, 25 mm.

There is a specimen of each sex, and fairly well preserved. The female differs from the male, besides size, only in the markings being less distinct and some occasionally obsolete. The species is a well-marked one, and new to the Museum collection.

GRYLLACRIDÆ.

GRYLLACRIS ATROFRONS, *sp. nov.* (fem.).

Size moderate, smoky-brown. *Face*, clypens and mandibles black, except large white ocelliform spot; sides of head brown; antennæ brown, base blackish; fastigium keeled. Pronotum above broadly and its hind margin entirely black, sides pale. Meso.- and metanotum blackish. Elytra and wings net-veined, pale brownish veins and veinlets deep brown. Femora above and externally dark, apices of middle and hind femora pale. Tibiæ with four small spines externally and internally, finely and shortly hirsute, black at the base, remainder pale; tarsi brownish, slender. Abdomen short, truncate, alternately pale and dark banded. Cerci slender, pale; ovipositor slightly curved, pale, apex darker, acute.

Length of body, 23 mm.
Length of pronotum, 4.5 mm.
Length of elytra, 39 mm.
Length of hind femora, 13 mm.
Length of ovipositor, 21 mm.

This species resembles *G. atrogeniculatus*, m., but is smaller and differs in the black face and top of head, large white ocelliform spot, keeled fastigium, and longer ovipositor, besides other characters.

DESCRIPTIONS OF NEW SPECIES OF AUSTRALIAN ELACHISTIDÆ, ETC.

By OSWALD B. LOWER, F.E.S. (Lond.).

[Read June 7, 1904.]

TINEINA.

ŒCOPHORIDÆ.

PHLŒOPOLA SCIASPILA, n. sp.

Male, 12 mm. Head and palpi whitish, second joint of palpi with a blackish apical and a blackish lateral stripe on basal two-thirds, and blackish apical ring. Thorax white, irrorated with fuscous, anteriorly dark fuscous. Antennæ greyish. Legs greyish, posterior pair fuscous, tibiæ and tarsi banded with whitish. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; white, finely irrorated with fuscous and with blackish markings; a basal spot in middle; a spot on costa at one-fifth; a second below and beyond; a third in middle beyond last two; an irregular elongate spot on costa at three-quarters; a short spot at end of cell, and another before and below; a darker suffused spot on costa at five-sixths, from which proceeds an oblique, fuscous shade towards anal angle: a few small, suffused dots along lower half of termen; cilia fuscous whitish, with a darker line below apex. Hindwings fuscous; cilia fuscous-whitish. A small species, distinct by the number of dots; the first four are very clear. Nearest *turbatella*, Walk.

Duaringa, Queensland. One specimen; in November.

OCYSTOLA HELIOTRICHA, n. sp.

Male, 20 mm. Head, thorax, antennæ, abdomen, and legs black, antennal ciliations four. Palpi orange, terminal joint black. Forewings elongate, moderate, costa hardly arched, termen oblique; orange; a narrow black streak along basal fourth of costa, extended at base to inner margin, thence continued along inner margin and gradually dilated to beyond middle, thence broadly dilated to reach costa, and fill up rest of apical and terminal portions of wing, upper half slightly curved anteriorly; cilia orange, with a black spot at apex. Hindwings orange: a broad, black band along termen; cilia black.

Exceptionally distinct by the orange wings and black markings.

Tasmania (probably Hobart); one specimen; in November.

BORKHAUSENIA (?) ERYTHROCEPHALA, n. sp.

Female, 14 mm. Head pale red, face paler. Thorax dark fuscous. Antennæ dark fuscous (imperfect). Abdomen and legs pale ochreous, anterior legs infuscated. Forewings elongate, moderate, costa gently arched, termen oblique, apex pointed; dark fuscous, somewhat mixed with reddish, and minutely irrorated with blackish scales; cilia dark fuscous. Hindwings elongate, apex pointed: fuscous: cilia pale ochreous. Underside of *both* wings clothed with blackish scales.

A species of doubtful affinity, and doubtfully referred; the antennæ are imperfect, and the wings are more pointed than usual.

Broken Hill, N.S.W. One specimen; in April.

BORKHAUSENIA AMPHIXANTHA, n. sp.

Male, 14 mm. Head and palpi pale ochreous, base of second joint externally and terminal joint of palpi fuscous. Antennæ fuscous, obscurely annulated with pale ochreous. Thorax fuscous, patagia ochreous. Abdomen fuscous, legs fuscous, banded above with ochreous. Forewings elongate, moderate, costa gently arched, termen obliquely rounded; pale yellowish, with fuscous markings: a spot at base of costa; a thick suffused streak along fold throughout: a narrow streak along costa, interrupted near base, and before and beyond middle; a dot on fold in middle: a second on fold at two-thirds, both connected with costa by a narrow shade; dorsal portion of wing suffused with fuscous, except near base and middle: a moderate apical patch; cilia fuscous, slightly ochreous-tinged at base. Hindwings light fuscous; cilia as in forewings. Somewhat allied to *Sulfurea*, Meyr., and *Protoxantha*, Meyr., but differs from both by the narrow forewings and other details.

Melbourne, Victoria. One specimen; in April.

ELACHISTIDÆ.

BATRACHEDRA ZONOCHRA, n. sp.

Female, 10 mm. Head, palpi, thorax, antennæ, and abdomen pale greyish-ochreous, palp rather short, antennæ with strong pecten. Legs whitish, more or less banded with greyish-ochreous. Forewings elongate-lanceolate: pale greywhitish, with rather obscure ochreous markings; a narrow transverse basal fascia; a second, similar, at about one-third; a third in middle: a more or less developed longitudinal streak in middle of wing, better developed, from posterior edge of third fascia to apex: a suffused patch at apex; containing a darker spot above anal angle; a narrow streak

along fold from beyond third fascia to below spot: cilia greyish, becoming fuscous tinged at base. Hindwings rather broadly lanceolate; grey; cilia five, pale greyish-ochreous.

Broken Hill, New South Wales. One specimen; in January.

BATRACHEDRA STENOSEMA, n. sp.

Male, 14 mm. Head, thorax, palpi, and antennæ ashy-grey-whitish, palpi whitish internally, antennæ obscurely ringed with fuscous, post-orbital rims whitish. Abdomen greyish-ochreous. Legs ashy-grey-whitish, posterior tibiæ and tarsi banded with dark fuscous. Forewings linear-lanceolate; ashy-grey-whitish, with blackish markings; a fine streak along fold; a second median, more or less interrupted, better developed on posterior half; a third, subcostal, only traceable on posterior half; an elongate spot on anal angle, some scales at apex; cilia grey. Hindwings very narrow, lanceolate-linear; grey; cilia grey-whitish.

Not unlike *Sterilis*, Meyr., but without the costal spots.

Broken Hill, New South Wales. One specimen; in April.

BATRACHEDRA (?) LYGROPIS, n. sp.

Female, 11 mm. Head dull whitish. Thorax fuscous. Palpi ashy-grey-whitish, internally whitish. Antennæ with moderate pecten, fuscous. Abdomen greyish. Anterior and middle legs fuscous, posterior pair whitish, tibiæ with two black bands, tarsi ringed with fuscous. Forewings elongate-lanceolate; ashy-grey-whitish, with fuscous markings: a moderately defined, flattened spot on fold just beyond middle, and a second similar on fold before anal angle; apical portion of wing slightly darker than general ground colour; cilia cinereous grey, terminal half grey. Hindwings lanceolate; dark grey: cilia greyish-ochreous.

Not unlike in general appearance *Artiastis ptochopa* (*Œcophoridæ*) Meyr.

Broken Hill, New South Wales. One specimen; in April.

BATRACHEDRA HYPOLEUCA, n. sp.

Female, 11 mm. Head, palpi, antennæ, thorax, and abdomen dull coppery-fuscous, abdomen beneath with broad whitish bands. Legs dark fuscous, posterior pair banded with whitish. Forewings elongate-linear: shining dark coppery-fuscous; cilia dark fuscous, becoming paler around anal angle. Hindwings fuscous, somewhat shining metallic; cilia dark fuscous on costa and around anal angle, greyish-ochreous on other portions.

Rather an inconspicuous species, but readily known by the whitish bands on under side of abdomen.

Broken Hill, New South Wales. One specimen; in October.

Calicotis microgalopsis, n. sp.

Male, 8 mm. Head, palpi, thorax, antennæ, abdomen, and legs shining snow white, posterior tarsi with whorls of long hairs at apex of joints, somewhat fuscous tinged. Forewings elongate, narrow; shining snow white; cilia snow white. Hindwings linear-lanceolate; white; cilia white.

Mackay, Queensland. Two specimens; in November.

The species is tolerably common, but owing to the active flight, and habit of falling to the ground when disturbed, were difficult to obtain.

Stathmopoda trichopeda, n. sp.

Male, 9-10 mm. Head and thorax dark fuscous, with coppery metallic reflections, face whitish. Palpi pale ochreous, terminal joint infuscated. Antennæ fuscous-coppery, fillet brassy metallic, basal joint ochreous. Legs pale ochreous, posterior pair dark fuscous, posterior tibiæ with tufts of bristly hairs at joints. Abdomen ochreous-orange, segmental margins fuscous, paler beneath. Forewings elongate, narrow; bright orange; markings deep coppery purplish: a moderate streak along basal one-fifth of costa, at base extended to inner margin; an outwardly oblique blackish line from middle of costa to just beyond middle of inner margin, beyond which the rest of wing is deep coppery-purplish, with a suffused blackish blotch in middle, hardly separated from ground colour: cilia dark fuscous, Hindwings elongate-lanceolate; shining bronzy-ochreous; cilia orange, fuscous around anal angle.

Recalls species of *Calicotis* in general appearance.

Mackay, Queensland. Five specimens; in November. Appearing to frequent one of the *Leguminosæ*.

Stathmopoda holobapta, n. sp.

Male, female, 10 mm. Head and palpi shining ochreous-white, terminal joint of palpi more ochreous. Antennæ ochreous, basal joint whitish. Thorax yellowish-orange, with two or three metallic longitudinal stripes. Abdomen blackish above, beneath white, anal tuft ochreous. Legs whitish, fuscous tinged, anterior coxæ shining white, posterior legs with blackish tufts at extremities of joints. Forewings narrow elongate; orange-ochreous, with shining golden metallic markings; a streak along costa from middle to apex: a longitudinal streak from base of costa, above and parallel to fold, thence reaching costa again at apex; a short, oblique streak from base of costa to one-quarter inner margin; a narrow streak in middle of fold; cilia fuscous. Hindwings bronzy fuscous; cilia fuscous, at base dull orange.

Probably nearest *Cyanopla*, Meyr., but differs, especially by colour of head, face, and abdomen, and other details.

Melbourne, Victoria. Two specimens; in November.

AEOLOSCELIS AULACOSEMA, n. sp.

Male, female, 10-12 mm. Head and thorax brownish-ochreous. Palpi whitish, annulated with fuscous. Palpi white, ringed throughout with fuscous. Legs silvery-white, tibiæ and tarsi banded above with fuscous. Abdomen greyish. Forewings narrow elongate; brownish-ochreous; a narrow, curved, interrupted black, posteriorly whitish-edged fascia, from costa at one-sixth to inner margin at one-quarter; a small black whitish-edged dot above fold about middle, below which is a leaden suffusion extending to fascia, but widely interrupted in middle; two fine, white elongate, subcostal lines at three-quarters, only separated from each other by a narrow black streak; below the lower streak is a strongly marked line of black, from posterior extremity of which proceeds a fine white line along fold towards the white-edged dot, but suddenly obliquely deflected to inner margin beyond middle before reaching it; a fine white line along fold immediately below, edged above with its similar width of black; a rather large, conspicuous black dot at apex, edged with white; a short, erect, anteriorly whitish-edged black spot at anal angle; cilia greyish-ochreous, becoming fuscous around apex, with a sharp black basal line and apical tooth. Hindwings greyish fuscous; cilia greyish-ochreous.

Mackay, Queensland. Several specimens amongst dry grass; in November and December.

AEOLOSCELIS EUPHÆDRA, n. sp.

Male, female, 9-12 mm. Head, palpi, antennæ, and thorax shining snow-white, antennæ slightly ochreous-tinged, thorax anteriorly bright ochreous. Abdomen ochreous, segmental margins whitish, more pronounced beneath. Legs silvery white, more or less banded with ochreous. Forewings narrow elongate; shining snow white, with bright ochreous markings; three well-defined rather broad, transverse fasciæ, edges irregular; first close to base; second from before middle of costa to middle of inner margin; third obscure, from five-sixths costa to three-quarters inner margin, with a slight sinuation above middle on anterior edge; a narrow, light ochreous, irregularly-edged fascia along termen; cilia greyish-ochreous, becoming ochreous at base. Hindwings elongate-lanceolate; light fuscous; cilia pale ochreous.

Mackay, Queensland. Four specimens, at light; in November.

Aeoloscelis petrosarca, n. sp.

Male, female, 10-12 mm. Head, palpi, antennæ, and thorax pale fleshy-ochreous, palpi whitish internally. Abdomen ochreous, whitish beneath. Legs whitish, posterior pair greyish-tinged. Forewings narrow elongate: pale fleshy-ochreous: a strong inwardly oblique narrow white streak from costa at three-fifths to inner margin in middle, edged posteriorly narrowly with black, especially on upper two-thirds; a fuscous dot on costa at three-quarters, and another in anal angle, both anteriorly edged with white, indicating a second fascia; cilia pale greyish-ochreous. Hindwings narrow: greyish-fuscous: cilia grey.

Townsville, Queensland. Two specimens, taken on sea beach, somewhat worn, in April.

Aeoloscelis hemicroca, n. sp.

Male, female, 10-14. Head, palpi, thorax, and antennæ ochreous-yellow, somewhat brassy-tinged. Abdomen ochreous, segments dull silvery-white. Legs pale ochreous. Forewings narrow elongate; pale ochreous-yellow, somewhat tinged with brassy, deeper ochreous on basal half; a narrow leaden metallic subcostal streak from base to beyond middle, attenuated posteriorly; a similar line along fold, from base to anal angle; cilia ochreous, mixed with greyish. Hindwings narrow: pale fuscous; cilia as in forewings.

Rockhampton and Duaringa, Queensland. Three specimens; in November.

Pyroderces argyrozona, n. sp.

Female, 8 mm. Head and thorax fuscous-orange, face shining white. Palpi white, banded with blackish, second joint more whitish. Antennæ white, sharply annulated with black, except towards apex, where there are two obscure blackish bands. Legs grey-whitish beneath, anterior pair banded above with black, posterior pair broadly banded above with dull orange. Abdomen ochreous, fuscous on terminal half. Forewings lanceolate, with expansible tuft of long ochreous hairs beneath: yellowish-orange, with silvery metallic markings, mixed with whitish: a narrow basal fascia extended to one-sixth inner margin: a narrow oblique fascia from costa at one-sixth to one-third inner margin, more whitish than others: a broader oblique fascia from costa in middle to beyond middle of inner margin: a similar one from costa near apex to anal angle, both the last fasciæ are somewhat dilated on costa: a narrow streak along termen: cilia greyish-ochreous. Hindwings linear: light fuscous; cilia as in forewings, but more ochreous at base.

Nearest *Schismatias*, Meyr., but abundantly distinct.

Duaringa, Queensland. One specimen; in November.

LIMNŒCIA HETEROZONA, n. sp.

Female, 7 mm. Head whitish. Palpi whitish, narrowly banded with black. Antennæ whitish, annulated with fuscous. Thorax fuscous. Legs and abdomen greyish, posterior legs more whitish, irregularly banded with black. Forewings elongate-lanceolate; blackish, with white markings; three equidistant transverse fasciæ: first from costa at one-sixth to inner margin at one-sixth, inwardly oblique, somewhat obscured on inner margin; second slightly broader and distinct, from costa in middle to inner margin in middle, but hardly reaching it; third from five-sixths costa to anal angle, obscure on lower half, and somewhat cuneiform on costa; cilia dark fuscous, mixed with blackish at base around apex. Hindwings narrow, linear at base; fuscous; cilia light fuscous.

Duaringa, Queensland. One specimen; in November.

LIMNŒCIA ISODESMA, n. sp.

Male, 14 mm. Head and palpi whitish-ochreous. Antennæ and thorax dark fuscous. Legs whitish, banded with fuscous, coxæ more whitish. Abdomen fuscous, anterior segments ochreous-tinged, beneath fuscous, ringed with whitish. Forewings elongate-lanceolate; dark fuscous, somewhat purplish shining; three equidistant, transverse, moderate whitish-ochreous fasciæ, from costa at one-fifth, beyond middle, and three-quarters respectively, all direct and reaching inner margin; cilia dark fuscous. Hindwings dark fuscous. Hindwings elongate-lanceolate; pale fuscous; cilia greyish-ochreous.

Easily known by the three equidistant fasciæ.

Melbourne, Victoria. One specimen; in November.

LIMNŒCIA ANISODESMA, n. sp.

Female, 18 mm. Head and palpi ochreous-white, antennæ and thorax fuscous, antennæ finely annulated with whitish, and with a broad whitish band beyond middle. Legs fuscous, banded with whitish, posterior pair somewhat ochreous tinged. Abdomen ochreous-fuscous. Forewings elongate-lanceolate: dark purplish-fuscous, somewhat iridescent: a broad whitish-ochreous fascia, from costa at one-sixth to one-sixth inner margin, posterior edge slightly curved outwards: a narrow transverse ochreous-white fascia, from costa beyond middle to inner margin at three-quarters: a nearly straight similar streak from costa at five-sixths to anal angle, narrowed on lower half, and almost cut in middle by a streak of ground colour: cilia dark fuscous. Hindwings elongate-lanceolate: dark fuscous: cilia fuscous; greyish at base.

Somewhat allied to the preceding, but the broad anterior fascia distinguishes it at once from that species.

Melbourne, Victoria. One specimen; in March.

SYNTOMACTIS DECALOPHA, n. sp.

Male, 12 mm. Head, palpi, antennæ, and thorax ashy-grey-whitish, terminal joint of palpi with three blackish rings, basal joint with two; antennæ annulated with fuscous, obscure on terminal half. Abdomen fuscous, beneath white. Legs white, tibiæ and tarsi obscurely banded with fuscous. Forewings elongate-lanceolate; light leaden fuscous, with ten black tufts of scales, anteriorly broadly edged with ferruginous-ochreous, posteriorly narrowly with whitish; a few small white marks along costa; first tuft on fold, near base; second obliquely above and beyond; third below fold at one-quarter; fourth above dorsum, about middle; fifth above and midway between third and fourth; sixth above dorsum at three-fifths from base; seventh subcostal, beyond middle; eighth, ninth, and tenth, small and inconspicuous, scattered between base and three-quarters; a small ferruginous fuscous spot on fold at three-quarters; a short fuscous subapical dash; cilia ashy-grey-whitish, mixed with greyish-ochreous on terminal half. Hindwings narrow-lanceolate, fuscous; cilia fuscous, mixed with ochreous towards lower half of termen.

Closely allied to *Argoscia*, but apart from the broader wings it differs, chiefly by the greater number of tufts, and absence of spots along costa.

Penola, South Australia. One specimen; in November.

SYNTOMACTIS ARGOSCIA, n. sp.

Female, 10 mm. Head, palpi, and thorax white, greyish-tinged, terminal joint of palpi with three black bands, second joint with two similar bands. Antennæ greyish, obscurely ringed with fuscous. Abdomen greyish-fuscous. Legs whitish, banded with fuscous. Forewings elongate-lanceolate; whitish, suffused with leaden fuscous along dorsum and apical third; tufts black, anteriorly ferruginous-edged, posteriorly narrowly whitish; one close to base below middle; three equidistant at one-fifth, two-fifths, and three-fifths respectively, basal two edged posteriorly more broadly with whitish; a fifth tuft on fold at one-third, and two or three small, indistinct ones above three-fifths; costal edge narrowly ferruginous-fuscous in middle; three or four costal ferruginous spots between posterior end of this and apex; some scattered elongate ferruginous marks in disc; a blackish elongate subapical streak; a rather sharply defined whitish line along termen; cilia fuscous-grey-whitish. Hindwings narrow lanceolate, fuscous; cilia light fuscous.

Probably nearest *tephras*, Meyr., but differs by the ferruginous markings and different arrangement of tufts.

Melbourne. One specimen: in December.

SYNTOMACTIS GNOPHODES, n. sp.

Female, 12 mm. Head, antennæ, thorax, and abdomen dark fuscous, head and face sprinkled with whitish. Antennæ obscurely annulated wth grey-whitish, abdomen beneath white. Palpi whitish, internally clearer, ringed with fuscous, somewhat obscure. Legs fuscous, posterior pair with tibiæ and tarsi banded with whitish. Forewings elongate-lanceolate: dark fuscous, mixed minutely with whitish, ferruginous, and fuscous metallic scales; tufts black; posteriorly finely edged with white, arranged in four transverse outwardly oblique series, the white posterior edging almost confluent, and thus tending to form narrow, thread-like fasciæ; first series of tufts close to base, rather obscure, followed on tornus by a moderate black tuft, finely edged with whitish; second series from one-third costa to one-third inner margin; third from three-fifths costa to about three-fifths inner margin; fourth from three-quarters costa to anal angle, a narrow black median streak from just before three-quarters to apex, cut by the fourth series of tufts; some white scales at apex, in which is placed a blackish spot; whitish scales along apical one-fifth of costa and along termen to anal angle; cilia dark fuscous. Hindwings and cilia dark fuscous.

Melbourne, Victoria. One specimen: in November.

SYNTOMACTIS PERINEPHES, n. sp.

Female, 18 mm. Head and thorax white. Palpi whitish, terminal joint with two fuscous bands, second joint internally fuscous, antennæ fuscous whitish. Abdomen fuscous. Legs white, somewhat infuscated. Forewings elongate-lanceolate: whitish, dorsal half fuscous: tufts blackish, somewhat ferruginous-edged, one near base below fold; a second on fold above and beyond, both small; a third transversely elongate, below fold at one-quarter; a fourth on fold, and a fifth on inner margin beyond middle; immediately following the last is a longitudinal streak of pure white, reaching anal angle, somewhat cuneiform; somewhat minute scattered scales of blackish on upper edge of dorsal streak; cilia fuscous. Hindwings and ciiia fuscous: cilia purplish-tinged.

Melbourne, Victoria. One specimen: in November.

SYNTOMACTIS POLYCHROA, n. sp.

Female, 12 mm. Head, thorax, and antennæ white, antennæ annulated with fuscous, basal joint blackish. (Palpi

broken.) Abdomen fuscous, mixed with metallic coppery, beneath whitish. Legs whitish, banded with fuscous. Forewings blackish-fuscous; markings white: a broad basal patch, occupying basal third of wing, posteriorly limited by a nearly straight, blackish line; in the middle of patch is an obscure narrow fuscous transverse streak, obscure on lower half: an obscure outwardly oblique fascia on costa at two-fifths, reaching nearly half across wing; a somewhat quadrate spot on costa at three-quarters, reaching half across wing, more or less connected with lower edge of previous fascia, and enclosing an elongate-triangular spot of ground colour on costa: scale tufts metallic: three equidistant just above inner margin, between one-third and two-thirds; a whitish one at anal angle; two small ones above fold between first and second; second subcostal, on lower edge of fuscous triangular patch; cilia fuscous, mixed with ferruginous at base, and with an obscure whitish spot at apex; costal cilia blackish. Hindwings blackish-fuscous: cilia greyish-fuscous.

Melbourne, Victoria. One specimen; in December.

SYNTOMACTIS MELAMYDRA, n. sp.

Male, 8 mm. Head, palpi, antennæ, and thorax black. Abdomen grey, beneath with white segmental bands. Legs greyish, posterior pair blackish. Forewings elongate-lanceolate; dark fuscous, mixed with and some metallic scales: tufts black, anteriorly metallic: cilia dark fuscous. Hindwings narrow-lanceolate; pale fuscous: cilia fuscous. An obscure species.

Melbourne, Victoria. One specimen; in September.

TRACHYDORA LEUCOBATHRA, n. sp.

Male, 10 mm. Head fuscous, face snow-white. Palpi white, basal half of second joint black, terminal joint fuscous. Antennæ dentate, fuscous, anterior half white. Abdomen and legs black, abdomen more or less ringed with silvery white, more prominent beneath, legs banded with silvery-white, posterior coxæ silvery white. Forewings elongate-lanceolate; seven to costa; black with snow-white markings: four costal spots, first at one-eighth moderate: second largest at one-quarter: third and fourth close together, somewhat raised, at three-quarters; three minute subapical spots, arranged longitudinally; two large spots on inner margin, reaching nearly half across wing at one-quarter and beyond middle: tufts white anteriorly, black posteriorly, one below last two costal spots and nearly resting on inner margin, and two close together, transversely placed on middle of inner margin: cilia white, becoming black at apex and anal angle. Hindwings narrow-lanceolate; dark fuscous; cilia rather

dark fuscous. Easily known by the snow-white spots on the blackish ground colour, and whitish antennæ.

Cooktown, Queensland. One specimen; in April.

TRACHYDORA POLYZONA, n. sp.

Male, 10 mm. Head and palpi white, basal half of second joint fuscous. Thorax fuscous, anteriorly whitish, patagia white, antennæ dentate, with small pecten; fuscous-whitish. Abdomen ochreous, strongly margined, beneath fuscous, banded with silvery-white. Legs banded with fuscous, tarsi fuscous, ringed with white, posterior coxæ snow-white, anterior legs dark fuscous. Forewings elongate-lanceolate; fuscous, mixed with ochreous and black, with whitish markings; a short, moderately broad, oblique fascia from costa at one-sixth, reaching more than half across wing; a second, broader, from costa before middle, anterior edge distinct, posterior edge somewhat suffused into ground colour; a similar fascia on inner margin at one-quarter, anterior edge distinct, posterior edge somewhat suffused; another at anal angle, somewhat triangular; all the above markings are edged on either side with darker ground colour, especially those on inner margin; three minute subapical spots, arranged longitudinally; tufts anteriorly white, posteriorly fuscous; a small one at base of second costal spot; a second transversely double on inner margin in middle; a third above anal angle, and two others clear white and curved on costa at three-quarters; cilia white, becoming dark fuscous at apex and anal angle. Hindwings narrow-lanceolate; greyish-fuscous; cilia light fuscous, on basal half greyish-ochreous. Somewhat allied to the above, but distinct by the different coloured forewings, etc.

Mackay and Cooktown, Queensland. Two specimens; in March and April.

TRACHYDORA ZOPHOPEPLA, n. sp.

Female, 16 mm. Head, palpi, antennæ, thorax, and abdomen blackish-fuscous, second joint of palpi with tuft large, whitish internally on basal half, basal joint of antennæ whitish beneath, abdomen white beneath, ringed on sides. Legs fuscous-whitish, coxæ more whitish. Forewings elongate-lanceolate; dark fuscous, with some scattered, deep ferruginous and whitish scales, tufts moderate, dull whitish, anteriorly edged with blackish; two near base; another almost resting on inner margin at one-half; a second just above and beyond; third at two-thirds, larger, resting on inner margin; a fourth just above; a fifth just above anal angle, edged anteriorly by a sharp black streak, which is edged below with ferruginous; cilia dark fuscous, becoming darker on basal half, and with some scattered whitish scales. Hind-

wings narrow-lanceolate; bronzy-fuscous; cilia fuscous, greyish-ochreous basally.

Stawell, Victoria. One specimen; in October.

TRACHYDORA MOLYBDIMERA, n. sp.

Female, 10 mm. Head, palpi, antennæ, and thorax ashy-grey-whitish, palpi more whitish internally at base. Legs whitish, posterior pair fuscous. Abdomen dark fuscous, beneath white, anal tuft beneath white. Forewings elongate-lanceolate: dull fuscous-leaden, with somewhat metallic reflections; tufts rather obscure, somewhat leaden metallic, edged with ferruginous; one on inner margin before middle; another just above, both obscure: a third, ridge-like on inner margin at two-thirds; a fourth subcostal, above third; a fifth at three-quarters in middle of disc, edged with a sharp black streak above; a narrow fuscous line along fold; some black scales along termen and around apex; cilia fuscous. Hindwings narrow-lanceolate; dark fuscous, somewhat shining: cilia as in forewings.

Melbourne, Victoria. One specimen; in March.

TRACHYDORA ANTHRASCOPA, n. sp.

Female, 20 mm. Head, palpi, antennæ, and thorax black. Abdomen grey-whitish, two anterior segments dull ochreous, beneath fuscous. Legs fuscous, mixed with whitish. Forewings elongate-lanceolate; black: a thick, black streak along fold from base to three-quarters: several obscure short streaks on posterior half of wing; some white scales along termen and apical fourth of costa: tufts moderate fuscous; one on fold at one-sixth; a second above and beyond; a third on fold at one-third, and two others, one above and one below third; three others similarly placed at posterior end of streak, middle one beyond others; another at anal angle: cilia blackish. Hindwings dark fuscous; cilia dark fuscous; greyish at base. Allied to *capnopa*, Low., but much broader winged, with abdomen with yellowish anterior segments, and with hindwings and cilia darker.

I have another closely allied species from Penola, South Australia, but not in a fit condition for description.

Grafton, New South Wales. One specimen; in December.

TRACHYDORA CENTROMELA, n. sp.

Female, 24 mm. Head, palpi, and antennæ grey-whitish, basal joint of antennæ darker fuscous. Thorax and abdomen fuscous, abdomen beneath silvery-grey. Legs fuscous, posterior pair grey-whitish. Forewings elongate-lanceolate: grey-whitish, tufts grey-whitish, anteriorly blackish; a broad blackish well-defined longitudinal median streak from base to apex, broadest on posterior two-thirds: apex of wing in-

fuscated; about four equidistant tufts of greyish scales resting on lower edge of streak, between one-third and three-quarters; two subcostal, one before and one beyond middle; cilia dark fuscous, mixed with whitish and grey, at apex with a black streak, continued from longitudinal streak to extreme tip, slightly curved. Hindwings lanceolate, moderately broad: shining bronzy-fuscous: cilia fuscous, becoming dull ochreous at base, especially towards costa.

Stawell, Victoria. One specimen; in December.

TRACHYDORA MICROLEUCA, n. sp.

Female, 20 mm. Head and thorax whitish. Palpi ashy-grey-whitish, terminal joint with three oblique black bands, second joint with an oblique band of blackish near base, above which is a narrow white sharply defined band. Antennæ fuscous-whitish, reddish tinged beneath towards base. Abdomen dark fuscous. Legs whitish, suffused with fleshy red and fuscous, anterior and posterior coxæ fleshy-red. Forewings elongate-lanceolate: cinereous grey: a black streak along fold from base to before middle: a similar streak beneath costa from base to middle; veins towards termen finely and obscurely outlined with black; tufts posteriorly white, anteriorly fuscous: first on fold at one-third; second on inner margin before middle; third above fold at three-fifths: fourth below fold at three-fifths: fifth just above anal angle; cilia fuscous, mixed with white on basal half. Hindwings lanceolate: bronzy-fuscous: cilia fuscous. The reddish legs and whitish tufts of forewings are excellent distinguishing characters of this species.

Cooktown, Queensland. One specimen: in November.

TRACHYDORA ARGONEURA, n. sp.

Female, 14 mm. Head, palpi, thorax, antennæ, and abdomen dark fuscous, second joint of palpi whitish internally towards base, abdomen ringed with whitish beneath. Legs grey-whitish, middle and posterior pair fuscous above, posterior tibiæ and tarsi banded with whitish. Forewings elongate-lanceolate: dark fuscous, more or less finely irrorated with whitish: a more or less distinct thick blackish streak from costa at base to apex, broadest on anterior half: a short elongate white streak lying on upper edge of streak at three-quarters from base: two very short oblique white streaks, from costa at one-sixth and one-quarter, reaching upper edge of median streak: streaks separated by a line of ground colour: a fine black line along termen and apex, posteriorly edged by a narrow whitish line, rather obscure: cilia cinereous grey, terminal third blackish. Hindwings lanceolate, narrow: fuscous: cilia fuscous.

Melbourne, Victoria. Two specimens; in March.

PETROGRAPHICAL DESCRIPTION OF SOME VARIETIES OF GRANITE FROM NEAR OLARY, SOUTH AUSTRALIA.

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[Read September 8, 1904.]

The rocks which form the subject of the present note were collected by my friend and colleague, Mr. W. Howchin, F.G.S., on a recent visit to the northern parts of the State. From their stratigraphical relationships he thought they might possibly represent the equivalents of the Tapley's Hill slates in a highly metamorphosed condition. He submitted them to me, with the object of obtaining evidence for or against such a theory. I have had some of the most typical varieties sectioned, and have described four of these with some detail. The stratigraphical relationships will be described by Mr. Howchin in a separate communication to this Society.

GNEISSIC GRANITE (A) FROM HILLS NEAR KING'S BLUFF, OLARY DISTRICT.

In hand specimen the rock appears holocrystalline in texture. The general colour effect is pinkish-grey. Its most obvious feature is the evidence of intense strain to which the rock has been subjected, and which has produced an imperfect foliation. The pressure has been relieved by shearing. The surfaces along which slipping has taken place are not planes, but are curved or irregular; a large amount of mica, both biotite and muscovite, has been developed on them, giving them quite a greasy lustre. With the naked eye and the lens there can be distinguished quartz, pink and white felspars, the latter striated, and glistening flakes of black and white mica, biotite being the more conspicuous of the two, though the largest flakes are of muscovite. These large surfaces of muscovite show a kind of "lustre mottling."

Microscopic Characters.

In section the texture is seen to be granitic, but the crushing has produced a complete shattering of many of the constituents, which makes the texture appear much finer than it must originally have been. The foliation seen macroscopically is not quite so marked under the microscope.

Quartz is abundant, and, as is generally the case, has suffered much more from dynamic forces than any of the other constituents, which, though softer, are less brittle. In ordinary light the large allotriomorphic sections of quartz appear perfectly limpid except for the comparatively few inclusions they contain. These appear to be chiefly cavities containing liquid, and a relatively rather large bubble, which, in some cases, shows spontaneous movement. In other instances the cavities contain only gas. Almost every grain of quartz ex-

hibits marked strain effects. These vary from the development of undulose extinction through peripheral shattering to complete granulation.

Felspar is abundant, and is of at least two types. Orthoclase occurs in comparatively large, completely allotriomorphic sections, which are colourless to somewhat cloudy in ordinary light. The cloudiness is some of it due to development of kaolin, but some of the secondary material cannot be referred to that mineral. The sections are mostly untwinned, but a few exhibit twinning after the Carlsbad law. The optical properties are perfectly normal, and there is little or no trace of shadowy extinction. The difference between the refractive index of this felspar and that of quartz is apparently much greater than that of the other felspar to be described.

The dynamic metamorphism of the rock has caused a little shattering of the orthoclase, but far less than in the case of quartz. In some instances grains appear to have been completely broken up, but mostly the effect is visible only around the edge. Some grains of felspar, which are partly untwinned, and then indistinguishable from orthoclase, show in their remaining portions a very fine, hazy, polysynthetic twinning: others, again, exhibit a similar structure throughout. This is extremely suggestive of an orthoclase.

Albite is present in just about the same proportion as orthoclase, and is of the same order of size, and exhibits similar strain and decomposition phenomena. Like the orthoclase, it is much less crushed than the quartz, but evidences of mechanical movements are not wanting in peripheral shattering and bending and faulting of the twin lamellæ. The refractive index is slightly lower than that of Canada balsam. Twinning after the albite law is seen in every instance, the lamellæ being narrow and extremely regular when not interfered with by mechanical deformation. Twinning after the Carlsbad law is by no means common, but is readily recognisable in a few instances. Sections perpendicular to (010) give a maximum symmetrical extinction of 9 . The extinction is sensibly the same in the two portions of a Carlsbad twin. These measurements indicate albite with a composition not far from Ab_{12} An_1.

The amount of true decomposition in the felspar is comparatively slight. Kaolinization has taken place to a certain extent, but not sufficiently to cause more than a cloudiness in transmitted light. But the alteration is not confined to kaolinization. A large amount of secondary muscovite has been produced. This is distributed in the form of small flakes throughout most of the sections of both types of fel-

spar. It is conspicuous in the felspar on account of its bright polarization colours and its higher refractive index, but is perfectly clear and colourless. Though scattered through the whole of the large grains of the enclosing mineral, it is particularly abundant, forming a selvage around their edges, especially where the fineness of the quartz mosaic indicates a point of intense compression. These features indicate very plainly its secondary origin. All the muscovite is not, however, of secondary origin. In marked contrast to these very minute flakes there are comparatively large ragged plates of the same substance fairly abundantly distributed through the section. Their optical characters call for no special remark. Like all the other constituents they have suffered in the processes of rock movement, the results being bending and fraying, and the presence of pseudo-inclusions of quartz and felspar. True inclusions are very scarce, and include only an occasional minute prism of apatite. The individual sections of biotite are all small, but their occurrence in "nests" accounts for the apparently large individuals when they are observed macroscopically. In no case is biotite intergrown with muscovite. The colour is light yellowish-brown: the pleochroism, though strong in yellow and dark brown tints, is not so powerful as is often the case with granitic biotite, the absorption never approaching extinction. Even basal sections are just noticeably pleochroic: in convergent light they give a dark cross which breaks up into hyperbolic brushes. The optic axial angle is very small. The usual decomposition into moderately pleochroic, bright green chlorite, with very weak double refraction, is observable. The only inclusions are a few small prisms, apparently zircon, but these are not surrounded by pleochroic halos. The biotite does not show strain effects.

Iron ores of various kinds appear as accessory constituents. Some of the opaque material seems to be magnetite, some is certainly ilmenite. The composition of most of it is probably that of titaniferous magnetite. Some leucoxene has been developed at the expense of these ores. A very occasional grain of pyrite is met with.

Traces of calcite occur amongst the thickest aggregates of secondary muscovite. Apatite is sparingly distributed throughout the rock.

Unfortunately, I am not in a position to have chemical analyses made, and the time and means at my disposal do not permit me to carry them out myself. As a substitute I have calculated the analysis from a quantitative determination of the mineral composition by the method of Rosiwal.*

* Cross, Iddings, Pirsson & Washington: "Quantitative Classification of Igneous Rocks." Univ. of Chicago Press, 1903, p. 204.

In this calculation certain assumptions have been made. It has been assumed that albite and orthoclase are present in equal amounts. This is very nearly correct, and a quantitative separation of the felspars would have very nearly doubled the time occupied in measurement. The variation in the amounts of SiO_2 and Al_2O_3 from this cause is certainly negligible. The total amount of alkalis is approximately correct, too. Albite has been calculated as pure Ab, whereas it is $Ab_{12}An_1$. Some CaO is thus neglected, and the Na_2O is correspondingly high. Ideal compositions have been assumed for orthoclase and muscovite. The composition assumed for biotite is that given by Messrs. Cross, Iddings, Pirsson, and Washington, in column C, Table xiv., of their "Quantitative Classification of Igneous Rocks."* This constituent occurs in such small amount that the error involved in using the assumed composition is certainly very small.

Na_2O and CaO, which occur in proportions amounting to only a fraction of a per cent., have been neglected.

Iron ores have been calculated as Fe_3O_4.

The chief probable errors in the calculated analysis are therefore as follows :—

Some CaO is certainly present, but the amount is likely to be less than 1 per cent. Na_2O is proportionately high.

TiO_2 is likely to be a very little low, as the TiO_2 content of the ores has been neglected.

H_2O is sure to be somewhat too low—probably not much.

Traces of S, CO_2, and P_2O_5 must occur. Analyses of two other granites are inserted for comparison. Both are taken from Dr. Washington's list of analyses :—

	I †	II.	III.
SiO_2	69·28	70·65	68·87
Al_2O_3	16·28	16·16	16·62
Fe_2O_3	1·64	1.53	0·43
FeO	1·52	0·52	2·72
MgO	0·70	trace	1·60
CaO	not estimated	0·55	0·71
Na_2O	2·90	0·54	1·80
K_2O	6·54	8·66	6·48
H_2O	0·97	1·22	0·74
TiO_2	0·18	—	—
P_2O_5	—	—	0·05
Total ...	100·01	99·83	100·02

* Loc. cit., Table xiv. Analysis C.

† N.B. Decimals are untrustworthy in I. They have been introduced to show that there has been no clerical error in calculation.

I. Gneissic granite, hills near King's Bluff, Olary, S.A. (calculated).

II. Granite, Chywoon, Morvah, Cornwall (Teall: British Petrography, 1888, p. 314).

III. Granite, Wilson's Creek, Omeo, Victoria (Howitt: Trans. Roy. Soc. Vic., vol. xxiv., 1888, p. 122).

The calculation of the norm leads to the following result:—

	Per Cent.
Quartz	26·04
Orthoclase	38·36
Albite	24·63
Corundum	4·49
Hypersthene	2·76
Magnetite	2·32
Ilmenite	·46
Total	99·06

The rock, therefore, belongs to Class I. Persalane, Order 2 Britannare, Rang. 1 Liparose, Subrang. 3. *Liparose.*

It is certain that a chemical analysis would show that some of the soda should be replaced by lime. A lowering of the soda by ·75 per cent. would bring the rock under consideration into Subrang. 2 (Omeose), of which the granite from Wilson's Creek, Victoria (Analysis III. above) is the type.

Gneissic Granite (b) from Hills near King's Bluff.

Macroscopic Characters.—In hand specimen the rock is light pinkish-grey in colour, speckled with black, and exhibiting silvery-white patches. The texture is holocrystalline, moderately fine, and the rock is roughly foliated. On examination with a lens, pink and white felspars are seen to be abundant, but striation of the felspar is not apparent. Abundant interstitial, milky quartz is present. The black material is biotite, the silvery mineral is muscovite, the two micas being about equally abundant. The muscovite is in larger flakes than the biotite and exhibits very markedly the phenomenon of lustre mottling. Additional evidence of strain is afforded by the occurrence of rough joints and by the development on them of secondary mica, both muscovite and biotite.

Microscopic Characters.—In section the rock is hypidiomorphic granular in texture. The foliation which is so marked a feature macroscopically is just as important under the microscope. In addition to the bending the indi-

vidual minerals show the effects of strain to a considerable extent. Decomposition has progressed very slightly indeed. Quartz is abundant in perfectly clear and very much rounded sections of comparatively small size. In the last rock described quartz formed a mosaic of small grains, but in this case there is nothing that can be called a mosaic. The individual grains are comparatively widely separated and are perfectly independent optically. The mineral is sparingly dusted through with very minute inclusions, which, under the highest power available, appear to be filled, some with liquid, some with gas. The shapes of these cavities are mostly irregular, but polygonal forms (negative crystals) are by no means rare. The liquid cavities have bubbles, whose volume bears no fixed ratio to that of the liquid. Movement of the bubbles is very pronounced. In addition to these unindividualised inclusions the quartz grains contain small grains and crystals of biotite, zircon, and rutile (?), the last two very rare.

Felspar is abundant in relatively large, perfectly allotriomorphic grains, the outlines of which are often very angular and irregular. At first sight there seems to be no connection between adjacent grains, but closer inspection shows that, in a fair number of instances at any rate, two or more neighbouring granules are certainly parts of a single original crystal. All stages between slight difference of optical orientation and a complete obliteration of all trace of relationship are met with. As a rule, the mineral is nearly free from decomposition products. Where the latter are present in anything like considerable quantities they are generally thickest along the (010) and (110) cleavage planes. In many instances the felspar is so perfectly water clear that it would be difficult to distinguish it from quartz but for the twinning, or, in its absence, the refractive index. Whilst mechanically the effects of rock movement are very marked in the breaking of the grains described above, optically the felspar is singularly free from any sign of strain. In all cases where the section is not parallel to the plane of composition fine lamellar twinning after the albite law is beautifully developed. Carlsbad twinning is associated quite often, but in only one instance have I detected lamellæ after the pericline law. In an odd crystal here and there the lamellæ are faulted, but they are nowhere bent, nor is there any extensive undulose extinction. This combination of characters makes the optical determination of the species easy and satisfactory. Sections in the zone perpendicular to (010) give maximum symmetrical extinctions of 13°. The difference in the extinction of different parts of the Carlsbad twin is just perceptible with

a Bertrand's quartz plate, but not measurable. Sections parallel to (010) are relatively fairly numerous. They show absolutely no trace of zoning, and so appear quite like orthoclase. The cleavage parallel to (001) and the rough cracks and lines of decomposition products permit the orientation of the sections to be determined. The extinction angle is $+18°$. In convergent light the point of emergence of an acute bisectrix is seen within the field, but near the edge. The optical sign is positive. The refractive index is less than that of quartz at all contacts. The felspar is thus almost pure albite, with no perceptible intergrowth with isomorphous compounds.

Muscovite, both primary and secondary, is abundant. As a primary mineral it forms large flakes, whose optical characters are quite normal. It is intergrown in the usual way with biotite, the basal planes of the two minerals being parallel. The mineral is perfectly destitute of colour, and exhibits no characteristic microstructure. It contains, as do all the minerals of the rock, a few prisms of rutile and apatite. The secondary mica, though distributed through the section, is particularly abundant in the folia containing much primary mica, where it forms felt-like masses, with strong double refraction. It is derived in part from the primary muscovite, as the latter can be observed fraying out and breaking up. Some of it is derived from felspar, as portions of unaltered felspar can be detected amongst it.

Biotite is primary in all cases. It is of the same order of size and abundance as the primary muscovite, and, as above noted, is intergrown with it. Both minerals are somewhat frayed out at the ends, but are not much bent or broken. The biotite is light yellowish-brown in colour, and is very strongly pleochroic. When the vibrations are perpendicular to the cleavage the colour is yellow, the vibrations parallel to the cleavage being almost entirely absorbed. Around the few small prismatic inclusions (probably rutile) marked halos of dark colour are produced. Grains and imperfect crystals of magnetite, all of comparatively small size, are present, but not abundant. Small prisms of apatite are even scarcer. The most abundant accessory mineral is rutile. This is scattered through the section, and is included by all the essential constituents. In most instances the rutile builds short, thick prisms, surmounted by pyramids, but occasionally the crystal form is not apparent, and the mineral assumes the shape of round grains. No certain trace of twinning was observed. The colour is bright orange by reflected light, reddish-brown by transmitted light, though the smallest individuals appear somewhat greenish. The refractive index is so high that many of the more round-

ed pieces appear almost opaque. Between crossed nicols only the smallest individuals show bright polarisation colours, on account of the exceedingly strong double refraction.

Gneissic Aplite, near base of Granite Range, West of King's Bluff.

Macroscopic Characters.—The rock is granitic in texture, and rather coarse in grain. The mass colour is yellow, but it is speckled with small grains of a black material, the arrangement of which points to a fairly marked foliation. Under the lens it is seen to consist almost entirely of felspar, quartz, and magnetite. Felspar is the most abundant constituent. It occurs in pinkish-yellow (tabular) sections up to about 8 mm. in diameter, striking on account of the perfection of the cleavage. On cleavages parallel to the base (001) twinning after the albite law can be noticed, combined occasionally with that after the Carlsbad law. Quartz is present in translucent grains of small size, but is fairly abundant. No mica or other ferromagnesian mineral is to be detected. The abundance of magnetite in so acid a rock is remarkable. The grains are up to about 1 mm. in diameter, and, as already noted, are arranged in roughly parallel lines. The rock is obscurely jointed, and a little secondary muscovite has been developed on the joint surfaces.

Microscopic Characters.—In thin section the rock possesses several features in very marked contrast to those previously described. In the first place, the absence of primary mica of any kind is very striking. Then the evidences of strain in the felspar are much more marked here. The abundance of magnetite in so acid a rock is also somewhat remarkable.

The essential minerals present are quartz, albite, and magnetite, the texture being hypidiomorphic granular.

Albite occurs in relatively large, perfectly allotriomorphic sections. These are, on the whole, perfectly clear and colourless, though they contain a considerable amount of dusty decomposition product. Examination of the optical properties indicates practically pure albite, the measurements being practically identical in all cases with those given for the other rocks described and as thoroughly satisfactory. The difference of extraction angle between the two portions of a Carlsbad twin rises here to about 3°. Lamellæ after the pericline law are quite frequent *and in all cases are certainly of secondary origin.* They appear in sections which have obviously been subjected to crushing, and in many instances there is a very obvious faulting along their plane of composition. The faulted portions, which have a step-like arrangement, contain pericline lamellæ, but no albite lamellæ, whilst in the

unfaulted parts the converse is the case. The plane of composition is thus a gliding plane. It has also acted as a solution plane, for the boundaries of the lamellæ are often marked by strings of irregular liquid and gaseous inclusions. In a section parallel to (010) the angle of inclination of these lamellæ to the trace of the (001) cleavage is slightly variable between the limits $+23°$ and $+26°$ These angles are greater than those for pure albite,* but as everything is so sharply defined I feel confidence in my measurements.

Additional evidence of strain is afforded by the condition of the albite lamellæ. These are in many instances bent and faulted. Where the latter effect has been produced the *albite lamellæ are suppressed for a short distance on either side of the fault line.* Another striking feature is observed in the neighbourhood of certain quartz grains. The lamellæ immediately surrounding the granules are suppressed, whilst those further out are curved so as to very strikingly resemble the "knots" in a piece of pine. The resemblance is still further apparent where the quartz grain does not appear in the thickness of the section, and only the bending of the lamellæ is apparent. These observations seem to suggest that in these rocks at all events *twinning after the albite law is of primary origin, but that molecular shifting may be produced by pressure, the result being an obliteration of the twinning. On the other hand, twinning after the pericline law is of secondary origin, and is accompanied by the development of gliding planes parallel to the plane of composition of the twinning.*

These results are interesting, and, if borne out by further investigation, may be of considerable importance. I do not by any means wish to announce them as a general law: the statement applies simply to the rock under examination.

Quartz is fairly abundant, and is under two fairly distinct habits: i., small, round sections, included fairly centrally in the albite; ii., larger and more irregular grains, which are interstitial in character, or else are included in the peripheral portions of the felspar sections.

The sections under the first category are, a few of them, certainly idiomorphic, the habit being that often found in quartz porphyries, viz., with almost entire suppression of the prism. Most of the sections are, however, nearly circular or only subangular. Those most centrally situated in the felspar exhibit no trace of optical continuity, but towards the

* Rosenbusch-Iddings: "Microscopical Physiography of the Rock-making Minerals," 4th edition, p. 329.

outer boundary of the host this property is strongly developed. All contain liquid inclusions with moving bubbles, but I think the individuals nearer the centre of the felspar contain fewer than those closer to the periphery or than the interstitial quartz. The latter occurs in relatively somewhat larger grains. It is perfectly angular, and shows the effects of strain in its shadowy extinction, incipient, and even advanced fracture. Much of it shows pegmatitic intergrowth with the albite.

Magnetite, as already stated, is remarkably abundant for so acid a rock. It occurs in idiomorphic subidiomorphic and irregular grains scattered through both the other minerals. It has not undergone much decomposition, but has nevertheless given rise to some staining of the rock with red and yellow oxides of iron. An interesting feature is that in the majority of instances the grains of magnetite are surrounded by a partial or complete halo of muscovite, giving bright polarisation tints.

Muscovite is very scarce in the rock. No large sections at all occur, but it all assumes the form of fine flakes around the magnetite grains, or grouped in aggregates with the general characteristics of what has been called in the other rocks described secondary muscovite. That some, perhaps all, of it may really be primary is rendered possible by the fact that some of the magnetite grains provided with halos are completely surrounded by quartz, and it is difficult to see how muscovite could be formed secondarily in such a position.

Gneissic Granite, Outcrop behind Olary.

Macroscopic Characters.—The rock is yellowish-pink in colour, holocrystalline, but somewhat fine in grain. It is markedly foliated in hand specimen. Under the lens it is found to consist of quartz, felspar, and chlorite.

Quartz is abundant in small, rounded grains, and is clear to milky. The felspar sections are mostly small, but here and there a comparatively large section is met with in the form of an "eye," though typical "*augen*" structure is not well developed. The mineral is flesh-coloured, and shows Carlsbad and albite twinning where the sections are large enough to show structures distinctly. Only a small amount of muscovite is developed, and this is in small pieces. Biotite is much more plentiful, and occurs in streaks, giving the rock the foliated appearance. The piece of rock under examination contains several foreign fragments. One of these is a small piece of sericite schist about 25 mm. x 10 mm. x 3 mm. All the others are fragments of vein quartz.

Microscopic Characters.—The rock is essentially a medium grained hypidiomorphic granular mixture of quartz and albite, with a considerable quantity of chloritic substance derived from limotite and ilmenite. All the minerals show strong evidence of crushing, which has probably materially modified the original character of the rock. Foliation obvious in hand specimen is not distinct under the microscope. The quartz and felspar call for very little description, as they present features similar to those in the three last rocks described. In this instance, however, there is more interstitial quartz and less included in the felspar, which is in much smaller pieces. Both minerals are much shattered, and give markedly undulose extinctions. In the felspar twinning after the albite law is moderately developed, but is very often hazy, perhaps owing to strain. Certainly the lamellæ are often bent and broken.

The chloritic material is dirty green in colour and is of markedly micaceous habit, the plates often being arranged in rosettes, which give a black cross between crossed nicols. The pleochroism is marked: light yellow when the vibrations are perpendicular to the cleavage, greenish when they are parallel to it. Double refraction is very weak, the colours being the characteristic azure tints of chlorite. Sections parallel to the cleavage are sensibly isotropic. The figure in convergent light is exceedingly hazy, but appears to indicate a biaxial mineral. At the edges of each flake the colour changes to bright orange-yellow, indicating a more ferriferous variety, and there is a corresponding increase in double refraction, the colours at the edge being of the same order as those of quartz. The original biotite must have been strongly titaniferous, as the chlorite which has been produced by its alteration is much mixed with granules, of greyish sphene, even where no ilmenite can be detected.

Ilmenite is moderately plentiful in rather irregular grains, which in some cases appear to be aggregates of minute granules. A certain amount of decomposition into leucoxene is noticeable.

Rutile in small, stumpy pyramids and rounded forms is scattered through all the minerals indiscriminately; in the chlorite they give rise to dark pleochroic halos. The smaller individuals are practically opaque, the larger ones show a dark reddish-orange colour by transmitted light. A few zircons, some of them of relatively very large size, are present, and are distinguished from rutile by their lack of colour and weaker double refraction.

Summary.

The rocks from all the localities studied agree in certain well-defined properties:—

i. They are certainly igneous in origin, and do not represent highly metamorphosed sediments.

ii. The triclinic felspar is of remarkably uniform composition throughout.

iii. All show evidence of intense earth movements at some period of their history.

iv. They are on the whole rather highly titaniferous.

The evidences of movement are somewhat variable and are rather difficult to interpret as a whole. Pure albite is characteristic, not of eruptive, but of metamorphic, rocks. It is to be noted that in the rock which shows the least advanced degree of crushing, namely, the first described, the triclinic felspar contains some An. In the remaining rocks it appears to be pure Ab. This seems to indicate a certain amount of molecular reconstruction.

In some of the rocks cataclastic structures are common, but in others, particularly the most thoroughly foliated ones, shattering is not noticeable. In the latter case it would appear that the rock was plastic at the time the reconstruction took place: that is, that it was at a sufficient depth below the surface to come into what Van Hise* has termed the zone of flowage.

It is probable that the first rock described represents the least altered facies.

The conclusion arrived at on page 189 with regard to the twinning of the albite is of interest if it is substantiated by other investigations.

* Van. Hise: "Some Principles Controlling Deposition of Ores." Trans. Ann. Inst. Mining Engineers, vol. xxx., 1900, p. 31.

PETROGRAPHICAL NOTES ON SOME SOUTH AUSTRALIAN QUARTZITES, SANDSTONES, AND RELATED ROCKS.

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[Read October 4, 1904.]

PLATES XXXIII. AND XXXIV.

When this paper was undertaken it was intended that it should be the first of a series dealing with the petrography of South Australia. As South Australia is remarkable for the comparative scarcity of its eruptive rocks, I began with those of sedimentary origin. I examined the arenaceous rocks first, as being of simplest mineral composition, and therefore most likely to retain their original characters in regions where metamorphic forces have been active. My removal from the State renders it impossible for me to complete the scheme outlined above, and I bring forward these isolated observations in the hope that they may stimulate some other observer to carry out what promises to be an extremely interesting and very valuable piece of research.

A detailed and systematic investigation of the microscopical petrography of the sedimentary rocks of South Australia is rendered absolutely necessary for the purpose of stratigraphical correlation, by the paucity of fossils in the Paleozoic, and probable absence of them from the pre-Cambrian, rocks.

Quartzites and sandstones from upwards of fifty different localities have been examined, and thirty-eight of the types are briefly described in the following pages. More attention has been paid to the microscopic than to the macroscopic characters.

One of the most important horizons of arenaceous rocks is the immensely thick series of quartzites, sandstones, and phyllitic slates which underlies the Cambrian glacial bed in the type district of the Sturt River, and which forms the whole of the western portion of the Mount Lofty Ranges in the immediate neighbourhood of Adelaide. There are probably several bands of quartzite in this series with almost identical lithological features. In absence of a very detailed outcrop map of this intensely folded and faulted region it is impossible to correlate the various outcrops at present.

Specimens from different parts of the district differ very considerably in texture and general appearance, but all agree in certain well-defined characteristics.

i. Mitcham.

Macroscopic characters.—Very coarse grained and intensely hard rock, composed of rounded and angular grains of different materials firmly cemented together. Fractures across and not around individual grains, fractured surface being very vitreous. Chiefly colourless quartz, together with a little which is smoky and still less opalescent. A good deal of fresh-looking, pinkish felspar and still more that is strongly kaolinized. Considerable number of rock fragments, mainly liver-coloured cherty rock and greenish schist.

Microscopic characters.—Texture very coarse. About 40 per cent. felspar, rest mainly quartz. Quartz in completely angular grains in optical contact. All show evidence of having been originally rounded grains. The present form is due to secondary deposition of quartz upon the clastic grains in *optical continuity* with the original (rejuvenescence of crystals). Inclusions not very abundant. Mostly liquid and gas cavities, the former with moving bubbles. These are mostly irregularly distributed through the quartz, but long lines of inclusions evidently occupying secondary solution planes pass without interruption through two or more contiguous grains. This indicates that the rock has been buried to a very considerable depth below the earth's surface. A few individualised inclusions consisting of small mica plates and zircon (?) crystals are also present. Not much evidence of severe strain. A little undulose extinction has been induced, but only very rarely has a quartz grain been completely shattered.

Felspars are of three distinct types:—*a*, Albite, in clear and undecomposed idiomorphic sections; *b*, microcline, fresh and somewhat idiomorphic; *c*, orthoclase, also fairly idiomorphic, but very much kaolinized. One very remarkable feature about the microcline is the very noticeable development of secondary felspar in optical continuity with the material of the originally rounded grains. Sometimes the rim shows no trace of twinning, but in other cases the twin lamellæ of the original grain are continued without interruption in the rim.

Composite grains more numerous than they appear to be macroscopically. Many of them are evidently composed of reef quartz, others of a finely granular aggregate of quartz and microcline (probably gneissic), others of an excessively fine-grained, cloudy, quartzose rock (chert), and a few of fine-grained micaceous schist.

A little barytes is present in small radial aggregates, but, considering the comparative abundance of this mineral in

veins and cavities in the Mitcham rocks, very little of it has been observed under the microscope.

Plate xxxiii., fig. 1, gives a general idea of the structure of this rock.

ii. Mitcham.

Macroscopic characters.—Very much finer in texture than i. This is probably due to its consisting of finer sediment originally, but the fineness of grain is also partly a secondary effect. Fracture and lustre as in i. Exactly similar mineral composition.

Microscopic characters.—Texture moderately fine. Nearly all grains very angular, a few rounded or ovoid. Largest grains are round ones of felspar, quartz grains smaller and more angular. Mineral constituents in about the same proportions as in i.

Quartz much shattered, almost every fragment showing undulose extinction. Inclusions not abundant, and without regular arrangement. Felspars of same types and general characters as in i., but showing very distinct evidence of strain in bending of twin lamellæ and development of undulose extinction. A good deal of sericitic mica is developed around the periphery and occasionally in the mass of the felspars.

A few moderately large flakes of muscovite are present, but most of the mica has a sericitic habit, and is evidently secondary in origin. In addition to the direct association of sericite with felspar a good deal is present as an interstitial cement.

Finely granular dolomite also is abundant as a cement, and a few grains of pyrites, biotite, and tourmaline are included. Composite grains as in i. This rock differs from i. only in its finer texture, which is evidently chiefly the result of pressure, and in the presence of secondary sericitic and dolomitic cement.

iii. Dunstan's Quarry, Stonyfell.

Macroscopic characters.—Exactly like ii.

Microscopic characters.—Intermediate between i. and ii. Texture moderately fine, and evidently the result of cataclastic processes. All grains show traces of rounding. Felspars less idiomorphic than in preceding types. Quartz much shattered, but still preserves traces of rejuvenescence of originally rounded grains. Sericite associated with felspar grains and distributed through slide as in ii. The amount of dolomite varies considerably in adjacent parts of the rock. In some sections it is entirely absent.

Rutile needles, pyrites, and tourmaline grains are present, the last being bluish in colour. Some of the felspar grains contain small crystals of apatite.

iv. Lower bed, Waterfall Gully; forming lip of fall.

Macroscopic characters.—Medium grained, very vitreous, pinkish quartzite, with a good deal of hæmatite staining. Felspar fragments as in the preceding rocks. Fractures across the grains.

Microscopic characters.—Moderately coarse in grain, though not so coarse as i. Mineral composition like i., but relatively less felspar. Felspar shows little trace of idiomorphism. Quartz exhibits much strain structure, often amounting to complete peripheral granulation. Secondary overgrowth of rounded quartz grains very marked. Planes of inclusions (gas and liquid) cut through adjacent grains. Some of the quartz grains contain excessively fine rutile (?) needles.

Composite fragments as in the preceding rocks. There is little sericitic material except in direct association with felspar grains. The sericitic areas, cleavage cracks in the felspars, and similar absorbent portions of the slide are strongly stained by iron oxides, and the pyrites of the preceding rocks is here represented by hæmatite pseudomorphs.

v. Waterfall Gully.

Very massive bed, at upper fall.

Macroscopic characters.—Rather fine-grained, intensely hard, vitreous quartzite, very much jointed, fracture conchoidal.

Microscopic characters.—Quartz much the same as in iv., but much less felspar, sericite very much more abundant. Cherty fragments rather abundant, and amongst other composite grains those composed of quartz and microcline are important.

In parts the rock consists essentially of a mass of angular and subangular quartz grains, set in fine sericitic ground mass. Strain structures in the quartz amount to complete shattering, but do not approach thorough granulation. Rejuvenescence of quartz grains marked.

vi. Gumeracha (exact locality not known).

Macroscopic characters.—Strongly pyritic, grey quartzite, very vitreous on fracture. Felspathic constituents not so prominent as in the rocks near Adelaide, as they are more colourless.

Microscopic characters.—Texture medium. About 30 per cent. felspar, rest chiefly quartz. There is a good deal of authigenic pyrites. Very subordinate amounts of biotite. Composite grains not recognisable with certainty on account of the intense crush.

The structure of this rock affords a beautiful illustration of the effect of crush. Every grain shows evidence of pressure in the development of undulose extinction, incipient fracture, or complete granulation. In spite of the abundance of felspar, however, there is no sericite developed. The quartz grains are *dovetailed*, and not cemented together In fact, there is practically no recrystallization of material, and this suggests that water was absent during the period of pressure. The production of cross-hatched twinning in a felspar as the result of pressure is illustrated in one section. The whole rock has a distinctly foliated appearance. The lines of inclusions in the quartz granules do not pass from grain to grain.

vii. Gumeracha (exact locality not known).

Macroscopic characters.—Rather coarse framed, very distinctly schistose quartzite, of pinkish colour. Fractures around the grains as well as across them. Parallel folia differ in texture and are differently silicified. No felspar noticeable.

Microscopic characters.—Coarser bands are probably due to entire recrystallization of the quartz. Strain structures comparatively slight, though there is a good deal of undulose extinction and peripheral granulation. A few rounded flakes of biotite are included, and lines of liquid and gas cavities are continuous from grain to grain. These lines appear to be perpendicular to the plane of schistosity of the rock, and therefore parallel to the direction of maximum pressure. The finer bands of the rock consist of completely angular quartz grains, whose arrangement gives a very marked foliated appearance to the rock, but which show remarkably little evidence of strain. These bands are crowded with small muscovite and biotite flakes, rutile crystals (some of which show geniculate twinning), and zircon crystals. The arrangement of all of these, with their long axes in one direction, makes the schistose appearance of the rock all the more striking. Some little patches of sericitic material are also present, but no felspar or composite grains can be observed. The rock, as a whole, is very porous.

viii. Mount Pleasant.

Macroscopic characters.—Very like those of vi.

Microscopic characters.—The same type of rock as vi., but finer in texture and more felspathic. About 40 per cent. of the rock consists of felspar, the rest is mainly quartz, a little biotite is present.

There is evidence of very severe crush, which has resulted in very extensive shattering of the quartz grains, with very

little development of undulose extinction or production of sericite. Quartz grains are dovetailed. Felspars are mostly microcline and orthoclase, the latter kaolinized. Composite grains are present, but are difficult to distinguish from granulated quartz fragments.

ix. Mount Pleasant.

Very similar to vii. Difference of grain in different bands is not so great. Much less mica is present, its place being taken by light-coloured interstitial chlorite.

x. Spring Creek, Mount Remarkable.

Macroscopic characters.—Distinctly banded rock, consisting of layers differing in composition and texture. Finer grained layers are dark greenish-grey in colour, and are composed chiefly of quartz, with a few felspar and rock fragments of a pinkish colour. Coarser grained layers are more pink because of the greater abundance in them of the coloured constituents above noted. Fracture rather round than across the grains, except in the finer bands.

Microscopic characters.—Consist of rather coarse, perfectly rounded grains, set in a finer ground mass of the same materials. Mineralogically similar to the type rock of Mitcham (i.), but differs in the very much greater relative abundance and variety of the composite grains. These make up quite 30 per cent. of the rock. Remainder of the rock is composed of quartz and felspar in about equal abundance. The felspars are similar to those in the Mitcham rock (i.), but are all rather decomposed: some contain a little chlorite along the cleavage cracks. No strain structures are noticeable in either quartz or felspar.

The most abundant or remarkable types represented among the composite grains are as follows:—

1. Rounded grains of reef quartz. 2. Rounded grains of quartz rock, whose high degree of internal granulation indicates that they were derived from crystalline schists. 3. Particles of very fine grained, nearly opaque, micaceous slate. 4. Fragments of decomposed holocrystalline, but rather fine-grained, eruptive rock, composed of kaolinized felspar, quartz, chlorite, and apatite. 5. A few pieces of granophyre, consisting of a mass of minute spherulitic aggregates of quartz and felspar.* A considerable amount of interstitial viridite is present and acts as a cement.

* A rock very similar to this occurs as a large erratic in the Upper Cretaceous series, near Stuart's Creek.

xi. West of Woodside (stone reserve, Section 221, Hundred of Onkaparinga).

Macroscopic characters.—Fine-grained, white quartzite, highly felspathic, breaks across the grains, much jointed.

Microscopic characters.—Very fine in texture, much crushed, and perfectly cemented. All the constituents in extremely angular grains. No recognisable composite grains, otherwise the rock is mineralogically very similar to the type rock of Mitcham, but felspars of all types are rather more abundant. There is a little clastic mica, but none that is certainly secondary. A small amount of interstitial chlorite is present.

xii. Anna Creek Railway Station. (Loose fragment on the surface. Quartzite hills occur immediately to the east.)

Macroscopic characters.—Very fine-grained grey felspathic quartzite, with vitreous lustre on fracture.

Microscopic characters.—Rather fine-grained mosaic of quartz and felspar. The latter mineral is not so abundant as in the Mitcham rock. All the original grains were completely rounded, but secondary outgrowth, affecting both quartz and felspar, has converted the rock into a perfect mosaic. None of the grains show the slightest evidence of strain. The felspars are mostly orthoclase, with only a little microcline and albite. The secondary rim, in the case of the felspar grains, is more kaolinized than the original material. A little tourmaline and pyrite is present. The mineral composition of this rock, obtained over five hundred miles north of Adelaide, is strikingly similar to that of the rock from Mitcham.

xiii. Baroota Creek, Flinders Ranges. Under the glacial bed.

Macroscopic characters.—Medium grained, greyish-white quartzite, with white felspathic particles.

Microscopic characters.—Identical in mineral composition with the rocks of Mitcham and Burnside, but different in texture. The rock consists of a number of quartz and felspar grains, and a good many composite particles set in a "mortar" of fine-grained, angular material of the same character, together with abundance of dolomite in sharp crystals, or allotriomorphic aggregates. It is possible that the fine-grained base of this rock is due to the shattering of larger particles through crush. Nearly all the quartz shows evidence of strain, but felspar crystals are present whose shape suggests that they have not been subjected to much pressure.

xiv. Maitland, Yorke's Peninsula. No. 1 bore.

Macroscopic characters.—Hard, brownish-pink quartzite, very vitreous on fracture. Abundance of clear to cloudy pinkish felspar present, and some rock particles. Some of the quartz is milky to opalescent, but most is clear.

Microscopic characters.—Very similar to those of the Mitcham and Burnside rocks. Texture coarse. Quartz is most abundant mineral, but felspar is plentiful. A good many schist fragments are present. The chief feature about the rock is the extraordinary perfection of the secondary outgrowth of the quartz grains. All the quartz grains must originally have been perfectly rounded. Secondary addition of quartz in optical continuity has produced a perfect mosaic. The original surfaces of the grains are indicated by lines of dusty inclusions. (Plate xxxiii., figs. 2 and 3.) The secondary silica is all quartz, no chalcedony having been produced.

xv. Two miles west of Ardrossan, Yorke's Peninsula. This rock outcrops on Mr. Dinham's farm, near the road to Maitland. It lies directly upon the upturned edges of pre-Cambrian schist and gneiss and is overlain, apparently unconformably, by very fine-grained vitreous quartzite and the strongly chalcedonized *Turritella aldingae* bed of the Eocene.

Macroscopic characters.—Very variable in hardness, some of it being almost unconsolidated sand, while in the same hand specimen are portions with the characters of an intensely hard quartzite. The material is almost entirely quartzose; a little chalcedony is present in the consolidated portions.

Microscopic characters.—On casual examination the large amount of milky white material in the rock suggests an important felspar content, but optical investigation shows that all this material is quartz, rendered almost opaque by the enormous number of minute, irregular gas cavities it contains. An appearance simulating cleavage is due to the arrangement of inclusions along well-defined parallel planes. No composite particles were observed. The secondary outgrowth of the originally rounded quartz fragments is very remarkable. In some parts of the rock adjacent secondary rims have met and mutually interfered, and a mosaic is produced. In other portions the rejuvenescence has reproduced ideally perfect quartz crystals with their free ends pointing into a cavity now completely filled with chalcedony. A little rutile is present in sharp crystals, and some hair-like prisms which may be rutile. There is a little muscovite and zircon and some dark brown tourmaline in grains and prisms. (Plate xxxiii., fig. 4.)

xvi. Two miles south of Ardrossan. A quarter of a mile north-east of Miss Norton's house.

Macroscopic characters.—Rather coarse, greyish grit, with a notable amount of pinkish and whitish felspar. Fractures around and not across the grains.

Microscopic characters.—Texture is medium. Quartz is predominant, but felspar and chert fragments are notable in amount. Quartz is in angular fragments, almost all of which show strain structures. Slight trace of rejuvenescence of grains, and in at least one instance a reconstructed granule has been subsequently broken (possibly owing to a second period of erosion and transport). The felspar is nearly all albite, there is very little orthoclase, and no microcline, the chert particles are reddish and nearly opaque. There is a good deal of yellowish opaque material, the decomposition product of rutile, and a few flakes of clastic mica. Cement is quite plentiful, and is mainly chalcedonic, though some calcite is also present. The latter may be allogenic material (derived from the Cambrian limestones upon which the rock appears to rest).

xvii. One and a half miles south of Ardrossan. Half a mile west of Parara. This rock occurs only about a quarter of a mile north of xvi., but, both in the field and under the microscope, it appears quite distinct from it. Traced in a northerly direction its texture varies from an incoherent sand to an intensely hard and tough quartzite.

Microscopic characters.—Moderately coarse, sub-angular grains of quartz, set in a fine-grained mosaic of the same mineral. All the grains are in optical contact. Many of them show traces of rejuvenescence, some of them to a high degree of perfection. Some brown tourmaline is present in small fragments.

The stratigraphy of these three quartz rocks from Ardrossan is very complicated, and needs further investigation for its elucidation.

xviii. Plain east of Mount Remarkable.

Macroscopic characters.—Very hard rock of medium texture, composed mainly of colourless quartz, with a little whitish material. Very vitreous on fracture.

Microscopic characters.—Rock consists of medium-sized, rounded grains, set in very fine textured interstitial cement. The latter makes up about 25 per cent. of the whole rock. About 95 per cent. of the larger grains are clear quartz, the remainder are ferruginous mica slate, generally excessively fine-grained. There is no felspar in the section. Rounding of grains is generally quite complete. In

certain bands ground mass is absent and the quartz fragments are cemented by secondary outgrowth of the original grains. The rock has undergone very considerable pressure. Where there is no fine-grained cement undulose extinction is very strongly developed, but where there is a cement between the grains this phenomenon is not observed. Throughout the whole rock a very marked parallel structure has been dedeveloped. This is expressed by a series of parallel planes crowded with minute liquid and gas cavities. These planes are interrupted where they pass from a grain into the base, but re-appear in the same direction in the next original grain. The liquid cavities contain minute bubbles, but in no instance could I detect spontaneous movement. (Plate xxxiii., fig. 5).

xix. Mount Lofty. Quarry in the northern peak of Mount Lofty.

Macroscopic characters.—An intensely white, moderately coarse-grained rock with granular fracture. No constituents other than quartz can be made out. Its general appearance is very well described by its local name of "Sugar-loaf Rock."

Macroscopic characters.—Texture medium, structure distinctly foliated. Consists essentially of quartz and muscovite, the latter chiefly of the sericitic variety. A notable feature is the entire absence of felspar of any kind. Crushing has been very intense, so that the original quartz grains have been completely shattered. All the particles in the rock are extremely angular and show shadowy extinction. In some instances the quartz granules are in optical contact, but generally are separated by at least a film of sericite. In the interstices between the quartz grains there are considerable areas occupied by a very fine-grained aggregate of sericite and some quartz. A comparatively few large flakes of muscovite also occur. The rock may originally have contained some felspar, which was subsequently sericitized: this is improbable, as there is no trace whatever of original felspar.

xx. Upper Sturt.

Macroscopic characters.—Fine saccharoidal quartzite, somewhat finer in grain than xix. and slightly pinkish in parts. A little muscovite is visible. Fracture is conchoidal and lustre vitreous.

Microscopic characters.—Texture medium, but somewhat variable, structure markedly schistose. Practically a pure quartz rock. The grains are extremely angular, and show the effects of intense crush in optical anomaly and complete shattering. Some of the particles show evi-

dence of having undergone rejuvenescence *before* the shattering took place. The individual grains have crenulated margins and are completely interlocked. Numerous small, perfectly round grains of zircon are present.

xxi. Sellick's Hill.

Macroscopic characters.—Exactly similar to those of xx., though the colour is somewhat more pinkish.

Microscopic characters.—Very similar to those of xx. In addition to quartz, the rock contains very small amounts of muscovite, biotite, apatite, zircon, and tourmaline, and is somewhat iron-stained. Evidence of crush is slightly less marked. Lines of inclusions pass continuously through adjacent grains. Dovetailing of grains, etc., as in xx. Secondary quartz veins pass through the rock; their injection must have been prior to the later part of the period of crushing (Plate xxxiii., fig. 6). Strong tendency to cleavage in the rock. The similarity between this rock and the preceding one is remarkable, as they come from two entirely different geological horizons. Upper Sturt is in the lowest portion of the Mount Lofty series, while Sellick's Hill is in the purple slate formation, the topmost formation in the series.

xxii. Tanunda.

The geological horizon of this rock has not been satisfactorily determined. The quartzite is associated with a very extensive series of tremolite-, actinolite-, andalusite-, and mica-schists, crystalline limestones, and coarse gneisses.

Macroscopic characters.—Intensely white, saccharoidal quartzite, of rather coarse grain, with bands of still coarser, clearer material. Fracture around the grains in finer, across the grains in the coarser, portion.

Microscopic characters.—Coarse-textured aggregate of quartz, with every evidence of intense strain. Grains completely shattered. Abundant liquid and gas cavities, the former with *slow-moving* bubbles. Strong tendency for the cavities to be arranged in lines continuous through adjacent grains. A few rounded flakes of biotite occur in the quartz and in some fragments numerous excessively fine rutile (?) needles.

xxiii. Mount Barker, northern end of the mount.

Macroscopic characters.—Medium-grained, hard white quartzite, very tough, and breaks with a conchoidal fracture. Slightly micaceous.

Microscopic characters.—Texture medium. Essentially an aggregate of very irregular quartz granules, with 2-3 per cent. muscovite in large flakes, some pyrite,

and a good deal of earthy hæmatite. No groundmass and no felspar or sericite. Structure roughly foliated. There has been a very considerable amount of crush, resulting in development of undulose extinction and granulation of quartz. In addition to liquid and gas cavities, the quartz contains numerous round flakes of biotite and muscovite, and small crystals of magnetite. Large flakes of muscovite, often bent and broken, are scattered through the rock, with a general parallel arrangement. Pyrite in fresh-looking cubes. A little rutile and zircon present in crystals and fragments.

xxiv. Mount Barker, outcrop about 300 yards west of the scarp of the mount.

Macroscopic characters.—Rather thin bedded rock, somewhat coarser than xxiii., and not so hard or vitreous. More yellowish in colour.

Microscopic characters.—Texture coarse. An aggregate of irregular quartz grains in optical contact, with no interstitial cement at all. Quartz is clear and glassy, and singularly free from liquid and gas cavities, except such as lie along secondary solution planes. On the other hand, little round flakes of biotite are extremely numerous. These are exactly like those so characteristic of gneisses, and indicate that the material was derived from a gneiss, and not from a granite. A very occasional grain of orthoclase is present, but no other felspar.

xxv. Blakiston, two miles west of Mount Barker.

Macroscopic characters.—Thin bedded schistose quartzite, whitish-grey in colour, moderately fine grain, fractures across the grains, somewhat micaceous.

Microscopic characters.—Very similar to xxiii., but very much more schistose. Biotite enclosures in quartz like those in xxiv., together with some andalusite. Parallel lines of inclusions (liquid and gas) run indifferently through all the grains. A fair amount of broken and bent muscovite flakes and brown-green grains and fragments and prisms of tourmaline are present.

xxvi. King's Bluff, Olary.

Macroscopic characters.—Very white, hard quartzite of fine grain. Contains no recognisable constituents other than quartz. Fractures across the grains.

Microscopic characters.—In all respects similar to xxiii., except that texture is more uneven. Largeish quartz fragments are set in a finer-grained mass of the same material. A fair amount of muscovite is present. Structure very markedly schistose.

xxvii. Waterfall Gully, about one mile from Burnside.

Macroscopic characters. — Greenish - grey rock, composed of fairly coarse, clear quartz grains, set in a finer-grained groundmass of the same substance, mixed with dark-greenish chlorite material.

Microscopic characters.—Moderately fine in general texture. Grains are subangular to rounded, and there is a moderate amount of interstitial cement. The chief constituents are quartz and felspars of the same types as those in the Mitcham rocks. They mostly show evidence of strain, and the felspars are rather decomposed. Some of the quartz shows abundant mica flakes as inclusions. There is a little magnetite in crystals, and some tourmaline and rutile. In addition to these constituents there are locally numerous minute rhombic sections of a mineral with moderate refractive index and strong double refraction. These are pleochroic, from blue to colourless. These characters and the measured angles of the sections suggest lazulite. This is the only rock in which I have been able to detect any mineral resembling lazulite, although Rosenbusch* states that this mineral is particularly characteristic of quartzites. The cementing material is mostly a dark green, almost isotropic delessite, though there is also a good deal of kaolin stained with iron oxides. (Plate xxxiv., fig. 1.)

xxviii. Clarendon Tunnel.

Macroscopic characters.—Greenish rock of moderately coarse texture, composed mainly of quartz, with some felspar, set in dark-green chloritic base. Much pyrite.

Microscopic characters.—Texture medium. Chief constituents are quartz, felspars, composite grains. The quartz contains numerous gas and liquid cavities, and inclusions of apatite, actinolite, rutile, and zircon. Composite grains are mostly rather coarse mica schist. Interstitial material is mostly dark-green delessite, with a little sericite. Much pyrite and a little tourmaline and apatite are present, and also patches of opacite.

xxix. Coromandel Valley, near Blackwood.

Macroscopic characters.—Fine-grained, white, hard quartzite, with numerous whitish patches.

Microscopic characters.—Rather fine in texture, composed mainly of quartz, with a little felspar, fragments of biotite schist, a good deal of sericite, and only a little chloritic material. Some of the quartz grains are crowded with radiating bundles of tremolite. The most striking feature of the section is the abundance and variety

* Rosenbusch: "Mikroskopische Physiographie," ed. 3rd, p. 500.

of tourmaline, which varies from black and opaque, through various shades of brown, green, and blue. A good deal of opaque leucoxene (?) is present and some zircon.

xxx. Field River, near the mouth.

Macroscopic characters.—A moderately fine, pinkish groundmass, in which quartz and felspar can be recognised, through which are scattered numerous larger fragments, up to a quarter of an inch diameter, of quartz, pink and brown felspar, and red jasper.

Microscopic characters.—Texture fairly fine. Grains are very angular, both large and small ones. Felspar is almost as abundant as quartz, and of the felspars microcline is much the most common. Quartz fragments almost all exhibit strain. The cementing material is almost exclusively calcitic, and shows a very strong tendency towards fibrous structure. A little sericitic material is also present and very little chlorite and leucoxene. (Plate xxxiv., fig. 2.)

xxxi. Field River, small overfold, near Hallett's Cove.

Macroscopic characters.—Rather finer in grain than xxx., with no strikingly large fragments. Colour more greyish than pink. Intensely hard and tough.

Microscopic characters.—Almost exactly similar to those of xxx. The cementing material here is more dolomitic, with a very strong tendency to idiomorphism. In many instances the carbonate forms spherical radial aggregates, with or without a quartz grain as a nucleus. There is a fair amount of magnetite and some rutile.

xxxii. Wilson, on the western slopes of the Black Jack Range.

Quite a number of bands of quartzite occur in this locality, interbedded with purple slates.

Macroscopic characters.—Very white, hard quartzites of fine grain, in which no mineral other than quartz can be recognised. Fracture is granular.

Microscopic characters.—*Fine-grained rock*, essentially a mosaic of quartz. The grains are mostly clear, except around the edges of originally rounded grains, where a line of dusty inclusions occurs. Strain structures are only slight. A very small amount of orthoclase occurs in rounded grains. A feature of the rock is the comparative abundance of zircon, in crystals and grains, which, though somewhat abraded, have suffered very little during transport.

xxxiii. Wilson, range three miles west of town.

Macroscopic characters.—Rather coarser in grain than xxxii. Very white and intensely hard. Silicification has been so complete that the rock appears almost homogeneous. Fracture is conchoidal, and lustre highly vitreous.

Microscopic characters.—Essentially a medium-textured mass of interlocking quartz grains. Very angular, and show evidence of intense strain. The rock is in all respects like that from Sellick's Hill (xxi., p. 203), and occupies an exactly similar stratigraphical position.

xxxiv. Metropolitan Brickworks, Blackwood.

In the glacial till at this locality erratics of quartzite are very numerous. I have examined a considerable number, but have found a very surprising uniformity of characters amongst them. They are medium in grain, and are very dense and hard. In many of them nothing but clear quartz can be identified with a lens. In other examples there are abundant white specks, strikingly like the felspathic constituents of the Mitcham quartzites on casual observation. Closer observation shows that these patches are finely granular, and have a distinctly greasy lustre.

Microscopic characters.—Texture is uneven, but is not coarse. The most abundant constituent is always quartz, in rather rounded grains, almost all of which show rejuvenescence. In the densest rocks, those without the white spots, this secondary addition of quartz has completely filled all the original spaces; in the other rocks spaces have been left. A comparatively few composite grains are present, mostly fine-grained schists or granular quartz.

The patches of white material noted above are seen to consist of masses of fibrous material, generally with radial arrangement; its optical properties and behaviour with acids indicate antigorite. There is nothing to show from what primary mineral it has been derived.

xxxv. Inman Valley.

A very remarkable rock formation has been found at intervals from this point on the south to Williamstown on the north. In its general appearance and its apparent stratigraphical relationships it is very strikingly suggestive of a repetition of the Cambrian glacial bed. Its characters are those of a conglomerate gneiss, though the degree of metamorphism varies very considerably. In the Inman Valley the boulders which exceed a foot in diameter have been much deformed by flowage. The groundmass is practically a coarse-grained mica schist, with well-marked "augen"

structure. The whole rock has been much jointed, the joint planes cutting sharply through groundmass and boulders indiscriminately. At Williamstown the metamorphism has been much more severe, so that in many places the rock becomes a somewhat friable mica gneiss. All the pebbles are much elongated, and in certain places it is difficult or impossible to distinguish where the pebble ends and the groundmass begins.

The rock under consideration is that which forms the boulders in the Inman Valley occurrence.

Macroscopic characters.—Dense, hard, greyish quartzite of rather fine grain. The individual constituents cannot be satisfactorily made out, but a black mineral is present.

Microscopic characters.—A completely granulated mass, consisting essentially of quartz, felspar, muscovite, and ilmenite. More than 50 per cent. of quartz, forming a perfect mosaic. Well-marked foliation. Strain has been relieved by perfect shattering, so that undulose extinction is not marked. Felspar is slightly decomposed and is all untwinned orthoclase, with no triclinic felspar at all. Muscovite about as abundant as felspar in granular aggregates and largeish plates. Fair amount of ilmenite in scattered, irregular grains. Numerous small crystals and grains of zircon and rutile, the latter exceptionally dark in colour. There is also a very little dark blue-brown tourmaline. (Plate xxxiv., fig. 3.)

xxxvi. Inman Valley. Groundmass of the above conglomerate.

Macroscopic characters.—As noted above, this groundmass is coarse in texture and gneissic in structure, with well-marked "auge" of quartz. It is very strongly micaceous, and a very conspicuous feature in it is the great abundance of ilmenite in large plates and grains. In some places the groundmass of the conglomerate contains nearly 50 per cent. of this mineral.

Microscopic characters.—Consist mainly of quartz and muscovite. The former occurs in large grains, showing evidence of crush in shadowy extinction and the presence of a "halo" of finely granulated material. "Augen" structure is even more marked than it is macroscopically. Much of the quartz is opalescent by reflected light. Some of the muscovite is in large plates, but most of it occurs in the form of minutely granular aggregates, in the most thoroughly comminuted parts of the rock. There is a good deal of ilmenite in irregular granular aggregates. Its lustre by reflected light is rather bright, and suggests magnetite, but the alteration around the edges into very typical "sagenite"

webs indicates its titaniferous character. All stages of alteration, from a mere peripheral zone to complete replacement by sagenite, occur. Tourmaline and zircon occur. (Plate xxxiv., fig. 4.)

xxxvii. Lake Eyre District, Upper Cretaceous (desert sandstone) formation.

Macroscopic characters.—Typical porcelainized desert sandstone. Light yellowish in colour and extremely tough, consists of rather fine, angular quartz fragments, cemented by fine, white, amorphous, opaline material. Very markedly conchoidal fracture.

Microscopic characters.—Larger fragments are of medium size, and are angular to subangular. Nearly all quartz, with only a few grains of microcline. Many of the particles exhibit strain phenomena, whose characters indicate that they were produced *before* the redistribution of the mineral: that is, that this rock has been formed from the materials of an older quartz rock which had undergone considerable pressure. It is almost certain that the older rocks must have been the Cambrian felspathic quartzites. A few cherty fragments are present. There are a fair number of broken crystals of zircon, and a very few grains of tourmaline and magnetite. A good deal of the interstitial material consists of very angular quartz grains down to submicroscopic dimensions. There is also a great deal of a white opaque substance, probably kaolin. The remainder is chiefly fine chalcedony, much of it showing evidence of the infilling of irregular cavities. In the centre of some of these cavities a little isotropic opal occurs, but only in very small quantities. There is no evidence of secondary outgrowth of quartz grains. (Plate xxxiv., fig. 5.)

xxxviii. William Creek.

An aboriginal chipping, picked up on the surface. From the great abundance of similar material in large angular pieces, evidently a local rock.

Macroscopic characters.— Perfectly homogeneous, structureless rock, of light greyish-yellow colour. Perfectly conchoidal fracture. Very tough and hard.

Microscopic characters. — Exceedingly fine grained. Mostly quartzose material so exceedingly fine in texture as to be almost unresolvable under the microscope. This is very variable in translucency: some of it is almost opaque, some quite transparent. It forms quite 90 per cent. of the bulk of the rock. The grains scattered through it, quite irregularly, are very sharp, angular splinters of quartz and an occasional zircon. This sharpness of the quartz grains is the most striking feature of the rock. They can have been

subjected to no attrition whatever, or, small as they are, they would have had the extremely sharp edges rounded off. The section, as a whole, shows very marked evidence of flow structure, quite like that so often seen in a rhyolite. It has evidently been caused to flow while in a plastic condition. There is no sufficient evidence upon which to ground the suggestion that this rock has had a glacial origin, but, considering its very peculiar structure and the great abundance and variety and large size of the erratics found throughout the desert sandstone of the Far North, the possibility of such an origin is well worthy of further investigation.

Summary.

Though the rocks which have been examined embrace only an exceedingly small proportion of the quartzites and sandstones of the State, they form a fairly representative collection, and certain fairly reliable conclusions may be drawn from the descriptions: —

1. The massive quartzites of the Mitcham formation (lying immediately under the Sturt glacial bed), in all their occurrences from Adelaide to Mount Remarkable, are characterised by abundance and variety of felspar, such as is shown by no rock beyond the limits of this formation.

2. The erratics from the glacial bed are certainly not fragments of Mitcham-Burnside quartzites, but somewhat resemble those from the Clarendon tunnel.

3. The quartzites associated with the archæocyathinæ bed (those of Sellick's Hill and Wilson) constitute another very definite type, quite distinct from those of Mitcham and Burnside.

4. The quartzites of the Mount Barker district are distinct from either of the above series.

5. The rock from King's Bluff, Olary, shows far more resemblance to those from Mount Barker than to those from near Adelaide.

6. The boulders in the Inman Valley conglomerate are very markedly different in character from the erratics in the glacial bed at Blackwood.

In conclusion, I wish to express my thanks to my friend and colleague, Mr. Howchin, for the keen interest he has taken in the work. Many of the types which have come under examination are from his private collection, the contents of which he placed unreservedly at my disposal.

I hope that the very incompleteness of the foregoing descriptions will cause some other worker to enter this field of investigation. I am sure that the interest of the work and the value of the results obtained will well compensate any one for the labour involved.

EXPLANATIONS OF PLATES.

Microphotographs of various types of quartzites described in the foregoing paper. In all cases the magnification is 15 diameters.

Plate XXXIII.

Fig. 1. Mitcham (i.). Crossed nicols. The particular point photographed is somewhat poor in felspar. Shows the completely interlocking arrangement of grains.

Figs. 2 and 3. Maitland Bore (xiv.). Fig. 2. is in ordinary light; fig. 3 the same portion of the section between crossed nicols. Show the very marked rejuvenescence of the quartz grains. In fig. 2 the outlines of the original grains are marked clearly by the rings of inclusions. In fig. 3 the optical continuity of the quartz *outside* these lines with that inside is apparent.

Fig. 4. Mr. Dinham's Farm, west of Ardrossan (xv.). Crossed nicols. Shows well the perfect rejuvenescence of quartz crystals and the infiltration with chalcedonic cement.

Fig. 5. Plain east of Mount Remarkable (xviii.). Ordinary light. Quartz and composite grains set in a fine base. The whole rock is crossed by a series of parallel, secondary solution-planes.

Fig. 6. Sellick's Hill. Crossed nicols. Show undulose extinction and marked tendency to cleave.

Plate XXXIV.

Fig. 1. Waterfall Gully (xxvii.). Ordinary light. Small rhombic sections, probably lazulite.

Fig. 2. Field River, near Hallett's Cove. Crossed nicols. Indicates irregularity of texture, strain phenomena, felspathic nature of rock, and (rather faintly) fibrous structure of calcareous cement.

Fig. 3. Inman Valley. Boulder from conglomerate gneiss (xxxv.). Ordinary light. Felspathic content and marked schistosity are shown.

Fig. 4. Inman Valley. Ground mass of conglomerate gneiss (xxxvi.). Crossed nicols. Shows the foliation of the rock and the optical evidence of strain, but does not exhibit well the "augen" structure.

Fig. 5. Lake Eyre District. Desert sandstone (xxxvii.). Angular quartz, set in a fine-grained ground mass, somewhat chalcedonic.

NEW AUSTRALIAN LEPIDOPTERA, WITH SYNONOMIC AND OTHER NOTES.

A. JEFFERIS TURNER, M.D., F.E.S.

[Read October 4, 1904.]

Family, ARCTIADÆ.

HELIOSIA CHAROPA, n. sp.

(Charopos, bright, cheerful.)

Male, 20-22 mm. Head and palpi orange-ochreous. Antennæ fuscous; in male simple, moderately ciliated (1). Thorax dark fuscous; apices of patagia ochreous. Abdomen dark fuscous: basal segment mixed with ochreous; tuft orange-ochreous. Legs fuscous; middle femora and apices of middle tibiæ ochreous: posterior pair wholly ochreous. Forewings elongate-oval, costa moderately arched, apex rounded, termen very obliquely rounded: bright orange-ochreous; with two transverse dark fuscous fasciæ; first from one-third costa to before middle of dorsum, narrower on costa, broadening slightly in disc; second broader than first from costa before apex to tornus, with an outward projection beneath costa, followed by an inward projection above mid-disc; cilia dark fuscous. Hindwings with termen rounded; ochreous: a very broad dark fuscous terminal band, containing an ochreous dot at apex: cilia dark fuscous.

Type in Coll., *Turner*

N.Q., Townsville, in February, June, and October; five specimens, of which four were received from Mr. F. P. Dodd; one I captured myself.

STENOSCAPTIA PHLOGOZONA, n. sp.

(Phlogozonos, with fiery band.)

Male, 15 mm. Head bright yellow. Palpi whitish ochreous. Antennæ pale fuscous: in male simple, moderately ciliated (1½). Thorax dull purple: tegulæ bright yellow. Abdomen fuscous. Legs ochreous: anterior pair somewhat infuscated. Forewings elongate-oblong, costa rather strongly arched, apex rounded, termen straight, slightly oblique: purple, with metallic reflections: a broad antemedian bright yellow fascia with straight edges: a narrow, bright yellow terminal band, broadest on costa, indented beneath costa, coming to a point at tornus: cilia bright yellow. Hindwings with termen rounded: whitish, thinly scaled; a broad fuscous terminal band: cilia fuscous.

Type in Coll., *Turner*.

N.Q., Townsville, in March; one specimen, received from Mr. F. P. Dodd.

Family, NOCTUIDÆ.

I agree with Mr. Lower in regarding *Grammodes clementi*, Swin., as a synonym of *Grammodes pulcherrima*, Luc., and *Marapana rhodea*, Turn., as a synonym of *Prionophora rhodinastis*, Meyr.

Section, AGROTINÆ.

Genus, PROPATRIA.

Propatria, Hmps., Cat. Lep. Phal. iv., p. 651.

Both species referred to this genus have a single apical hook on fore tibiæ. This would materially alter the position of the genus in Sir G. Hampson's tabulation.

ADISURA MARGINALIS.

Anthophila marginalis, Wlk., Brit. Mus. Cat. xii., p. 830.

Adisura marginalis, Hmps., Cat. Lep. Phal. iv., p. 121.

N.A., Port Darwin; N.Q., Townsville; Q., Brisbane. Also from India.

Section, CARADRININÆ.

EUPLEXIA CHLOEROPIS, n. sp.

(*Chloëropis*, greenish-looking.)

Male, 40 mm. Head whitish. Palpi whitish, upper surface brownish; second joint annulated with dark fuscous. [Antennæ broken.] Thorax brownish, with some whitish scales. Abdomen grey; apices of segments and tuft ochreous Legs whitish ochreous, mixed with pinkish-brown and fuscous. Forewings elongate-triangular, costa straight, termen bowed, slightly oblique; brownish, mixed with whitish and fuscous; a whitish spot at base of costa and a second spot, bisected by a fuscous line, on costa near base, both partly suffused with greenish; orbicular greenish, with a few central fuscous scales: reniform similar, but more obscure: a fine dentate, blackish, post-median line, from three-quarters costa to three-quarters dorsum; a suffused whitish apical spot, from which a faint whitish line proceeds to tornus: an interrupted dark fuscous terminal line; cilia, bases green-whitish, apices grey. Hindwings with termen rounded: dark fuscous: cilia whitish, bases fuscous near apex. Under side of forewings fuscous, with a pinkish-brown costal streak: of hindwings whitish-ochreous, with a dark fuscous discal dot and broad terminal band.

Type in Coll., *Turner*.

Q., Biggenden; one specimen, received from Mr. H. Tryon.

PROMETOPUS RUBRISPERSA, n. sp.

(*Rubrispersus*, speckled with red.)

Female, 30-32 mm. Head, thorax, and palpi pale reddish, irrorated with dark fuscous. Antennæ ochreous-whitish. Abdomen pale grey. Legs, dark fuscous, irrorated and annulated with whitish. Forewings elongate-triangular, costa scarcely arched, apex round-pointed, termen moderately oblique, slightly bowed, slightly crenulate; fuscous intimately mixed with blackish, whitish, and reddish scales, the last varying in depth of colour in different individuals; lines interrupted and indistinct, indicated by blackish scales, edged posteriorly by pale scales; two or three short sub-basal lines from costa to fold; an antemedian and a postmedian line; six to eight whitish dots on costa; orbicular reddish-white, edged thinly with blackish scales, circular; reniform similar in coloration as far as its median portion, the upper and lower parts obsolete, or faintly indicated by a thin, blackish outline: a fine, dark fuscous, terminal line; cilia fuscous, mixed with pale reddish. Hindwings with termen rounded, wavy; grey, paler towards base; cilia whitish.

Type in Coll., *Turner*.

Q., Brisbane, Toowoomba: four specimens.

PROMETOPUS XERAMPELINA, n. sp.

(*Xerampelinos*, reddish.)

Female, 35 mm. Head, thorax, and palpi pale reddish, with scattered fuscous scales. Abdomen pale reddish-ochreous irrorated with fuscous. Legs pale reddish, irrorated, and tarsi annulated with dark fuscous. Forewings elongate-triangular, costa nearly straight, termen bowed, oblique, slightly crenulate: pale reddish, irrorated with fuscous: a narrow fuscous antemedian line from one-quarter costa to two-fifths dorsum, outwardly curved, slightly dentate: orbicular obsolete, reniform very faintly indicated; a narrow, fuscous, dentate postmedian line from mid-costa to three-fifths dorsum, outwardly curved in upper two-thirds; a sub-terminal series of pale reddish dots; terminal edge fuscous: cilia reddish barred by dark fuscous irroration. Hindwings with termen slightly sigmoid: whitish; towards termen suffused with fuscous: cilia whitish, tinged with reddish.

Type in Coll., *Turner*.

W.A., Coolgardie: one specimen.

PROMETOPUS INASSUETA.

Prometopus inassuetа, Gn., Lep. v. p. 38, pl. iii., fig. 9.
Caradrina chromoneura, Turn., P.L.S.N.S.W., 1902, p. 86.
Erastroides lichnomima, Turn., P.L.S.N.S.W., 1902, p. 110.
Q., Brisbane; T., Launceston, Ulverstone.

Queensland specimens have the forewings suffused with green, especially towards base, and the ochreous streaks on veins are replaced by green.

PROMETOPUS NODYNA.

(*Nodunos*, pleasing.)

Male, 30 mm. Head and thorax white, intimately mixed with dark fuscous. Palpi white, with a broad, median, dark fuscous ring. Abdomen grey-whitish. Legs whitish, irrorated, and tarsi annulated with dark fuscous. Forewings elongate-triangular, costa nearly straight, termen bowed; whitish, irrorated and suffused with fuscous: a short, dark-fuscous, longitudinal streak from base of costa; a fuscous dot on costa near base; an interrupted fuscous line from one-sixth costa to one-fourth dorsum: followed by a similar line, which joins it before dorsum; a suffused straight fuscous fascia from mid costa to beyond mid-dorsum; orbicular and reniform obsolete; an outwardly curved, whitish line from three-quarters costa, margined posteriorly by a fuscous line, both lost in disc; a whitish, dentate, subterminal line; a dark fuscous spot on termen above tornus: cilia white, barred with dark fuscous. Hindwings with termen rounded: whitish-grey: cilia whitish, with an interrupted median fuscous line.

Type in Coll., *Turner*.

Q., Brisbane, in February: one specimen.

Section, NOCTUINÆ.

CORULA DELOSTICHA, n. sp.

(*Delostichos*, with conspicuous lines.)

Male, 22 mm. Head and palpi dark brown. Antennæ pale grey; in male with long bristles (3), and shorter cilia (1). Thorax grey-whitish, mixed with some brownish scales: collar ochreous-brown, edged posteriorly with dark brown. Abdomen pale grey: extreme base and tuft whitish. Legs whitish-grey; anterior pair fuscous. Forewings elongate, costa gently arched, apex rounded, termen bowed, slightly oblique; grey-whitish; all veins marked by very distinct, dark fuscous lines: a transverse brownish-fuscous fascia, edged posteriorly by dark fuscous, at two-thirds; cilia grey-whitish, barred by prolongations of lines on disc. Hindwings with termen sigmoid, rather strongly incurved beneath

apex, thence rounded; whitish, towards termen broadly fuscous; cilia whitish, obscurely barred with fuscous.

A neat and very distinct species. Type in Coll., *Illidge*.

Q., Eumundi, near Nambour. One specimen, bred from *Casuarina*, by Mr. R. Illidge.

PRAXIS ALAMPETA, n. sp.

(*Alampetos*, dark, unlightened.)

Female, 32 mm. Head and palpi dark fuscous, mixed with pinkish-white. Thorax dark fuscous, mixed with brown-whitish. Abdomen dark fuscous, irrorated with white; a small pinkish tuft on mid-dorsum. Legs dark fuscous, irrorated with whitish; posterior pair mostly whitish; tarsi annulated with pinkish-white. Forewings triangular, costa straight, termen bowed, slightly oblique, crenulate; dark fuscous, irrorated with whitish; in basal half are several ill-defined, waved, blackish, transverse lines; an obscure S-shaped whitish spot beneath one-third costa, connected by a whitish suffusion with dorsum; an obscure, finely dentate, white, postmedian line, and a similar more distinct subterminal line; a blackish terminal line, preceded by a series of whitish dots, cilia fuscous, mixed with whitish. Hindwings with termen rounded, crenulate; dark fuscous; base whitish; a white line from two-thirds dorsum nearly to costa; a short, nearly parallel, white line from tornus; terminal line and cilia as in forewings.

But for the absence of red scales on the wings this is very similar to *marmarinopa*, Meyr.

Type in Coll., *Turner*.

Q., Brisbane, in January. One specimen.

LYNCESTIS MACROSTICHA, n. sp.

(*Macrostichos*, long-streaked.)

Male, 48 mm. Head and palpi whitish, irrorated with a few brownish scales; terminal joint of palpi annulated with dark fuscous. Antennæ ochreous-fuscous, towards base whitish; in male shortly laminate, very shortly ciliated (½). Thorax grey-whitish; collar whitish, irrorated with brownish, with a median blackish transverse line; posterior crest well marked, brownish tinged. Abdomen whitish, apices of segments ochreous, basal crests grey-brownish. Legs whitish, irrorated with brownish and fuscous. Forewings elongate, costa straight, termen bowed, oblique, crenulate; white, suffused with grey; a blackish streak from base beneath cell and vein two to termen; a similar streak from end of cell becoming suffused and bent upwards near termen; a V-shaped, blackish, suffused mark resting on termen above termination

of first streak; veins partly slenderly outlined by blackish scales; cilia grey. Hindwings with termen rounded; white, translucent; a broad, dark fuscous apical blotch extending to mid-termen; cilia white, interrupted by dark fuscous on mid-termen. Under side of forewings white, with a large, subterminal, dark fuscous blotch: of hindwings similar to upper side.

Type in Coll., *Turner*.

N.Q., Townsville, in February. One specimen, received from Mr. F. P. Dodd.

ISCHYJA PORPHYREA, n. sp.

(*Porphureos*, purple.)

Male, 66-70 mm. Head and palpi dark fuscous. Antennæ fuscous: in male moderately bipectinated (2), terminal one-fifth serrate. Thorax dark fuscous, with a purple sheen. Abdomen dark fuscous. Legs dark fuscous, with a few whitish hairs; femora and tibiæ densely hairy: tarsi with whitish annulations. Forewings triangular, costa straight to near apex, then strongly arched, apex acute, slightly produced, termen nearly straight, oblique: dark fuscous, with a brilliant purple sheen not extending to termen: a very few scattered whitish scales: a small, brownish-ochreous spot beneath costa beyond middle: a series of whitish dots from three-quarters costa, ending in a small, suffused brownish-ochreous blotch above dorsum: cilia pale ochreous. Hindwings with termen slightly rounded: colour, subterminal dots, and cilia, as forewings.

Type in Coll., *Turner*.

N.Q., Thursday Island. Kuranda (Dodd). Three specimens.

Section, ERASTRIANÆ.

ERASTRIA RHAPTINA, n. sp.

(*Rhaptinos*, embroidered.)

Male, female, 19-20 mm. Head and thorax whitish, with some fuscous scales. Palpi fuscous. Antennæ whitish: in male shortly ciliated (½). Abdomen ochreous-whitish: with a single, small, erect, basal crest tipped with fuscous. Legs fuscous, mixed with whitish. Forewings triangular, costa nearly straight, termen bowed, oblique: pale fuscous, mixed with white: a series of six white dots on costa, with a larger dot on apex: a double white antemedian line from dorsum before middle, inwardly oblique, not reaching costa: orbicular, 8-shaped, white, with a few central dark scales: reniform similar, but larger: a slightly sigmoid double white line from four-fifths costa to two-thirds dorsum; an irregu-

larly whitish terminal band, partly suffused with fuscous; an interrupted, dark fuscous, terminal line; cilia whitish, bases mixed with fuscous. Hindwings with termen rounded: whitish, with slight fuscous suffusion towards termen; a narrow, fuscous terminal line; cilia whitish.

I hardly think this is a true *Erastria*.

Type in Coll., *Turner*.

N.Q., Thursday Island. Five specimens.

MEGALODES HEDYCHROA, n. sp.

(*Heduchroos*, pleasantly coloured.)

Male, 22 mm. Head whitish, with a posterior white-centred black spot; face ochreous-fuscous, with an acute, anteriorly projecting, corneous process, slightly bifid at apex. Palpi dark fuscous, apex of second joint narrowly whitish. Antennæ whitish-ochreous; in male shortly ciliated (½). Thorax pinkish-white: collar black, with some pinkish-white and brown scales. Abdomen grey, apices of segments and tuft pale ochreous. Legs ochreous-whitish; anterior and middle pairs annulated with dark fuscous. Forewings elongate-triangular, costa straight to near apex, where it is strongly arched, termen bowed, oblique: pinkish-white: a narrow transverse black line from costa near base to fold; a rather large black spot on one-fourth costa, followed by a fine, wavy, black line extending to two-fifths dorsum: a similar line from two-thirds costa bent first outwardly, then inwardly to two-fifths dorsum: a leaden grey suffusion on dorsum between transverse lines, connected by a pale grey line with costa; a large, oval, pale grey spot within postmedian line; a black blotch on costa before apex, and two black spots before tornus: cilia whitish, on mid-termen and tornus leaden grey. Hindwings with termen rounded: grey; cilia grey.

Type in Coll., *Turner*.

Q., Dalby. One specimen.

AXIORATA GLYCYCHROA, n. sp.

(*Glucuchroos*, sweetly coloured.)

Female, 19 mm. Head and thorax pinkish-white, irrorated with fuscous: frons prominent, rounded. Palpi fuscous. Antennæ fuscous. Abdomen fuscous, irrorated with whitish. Legs fuscous, irrorated, and tarsi annulated, with whitish. Forewings triangular, costa slightly arched, apex rounded, termen rounded, oblique; pinkish-white: base, costa, and termen densely irrorated with dark grey; a reddish spot near base of costa: a broad, median, dark grey fascia, edged by dentate lines, which are reddish, mixed with dark fuscous; cilia dark grey, with a series of whitish dots

on bases. Hindwings with termen rounded; dark grey, cilia grey.

The genus *Axiorata* (Turn., P.L.S.N.S.W., 1902, p. 120) agrees with *Pachylepis* (Hmps., Moths Ind., ii., p. 337) in the non-crested abdomen and stalking of veins 7, 8, 9, 10 of forewings, but differs in the stalking of 3 and 4 and 6 and 7 of hindwings.

Type in Coll., *Turner*.

N.Q., Thursday Island. One specimen.

Section, HYPENINÆ.

NODARIA ANELIOPIS, n. sp.

(*Aneliopis*, gloomy looking.)

Female, 28-30 mm. Head, thorax, palpi, and antennæ fuscous. Abdomen fuscous mixed with whitish. Legs fuscous, with some whitish scales. Forewings elongate-triangular, costa nearly straight, termen bowed, slightly oblique: fuscous; a dark fuscous median discal dot; a wavy darker line, succeeded by a pale line, from five-sixths costa to five-sixths dorsum: a terminal series of minute, dark fuscous dots: cilia fuscous. Hindwings with termen rounded, slightly indented beneath apex: pale fuscous; cilia fuscous whitish.

In this species and in *Nodaria armatalis*, Wlk., vein 5 of hindwings arises from close to lower angle of cell, but both have the characteristic palpi of *Nodaria*, and so differ from the genus *Simplicia*.

Type in Coll., *Turner*.

N.Q., Thursday Island, Townsville. Three specimens.

Family, GEOMETRIDÆ.

Sub-Family, GEOMETRINÆ.

EUCHLORIS PERIPHRACTA, n. sp.

(*Periphraktos*, fenced around.)

Male, female, 24-28 mm. Head ochreous; fillet whitish; face reddish-ochreous. Palpi ochreous. Antennæ whitish; in male with long pectinations (6), apical fourth simple. Thorax green: collar and bases of patagia ochreous; a median ochreous spot, continuous with abdominal streak. Abdomen green, towards apex whitish; a median ochreous streak, becoming obsolete posteriorly; beneath whitish. Legs whitish; anterior and middle pairs brownish anteriorly, except anterior coxæ, which are ochreous. Forewings triangular, costa straight, slightly arched towards apex, apex tolerably pointed, termen nearly straight, oblique: green, inclining to bluish-green: a broad, deep-ochreous costal streak, costal

edge paler; a whitish-ochreous wavy line from beneath one-third costa to two-fifths dorsum; a similar line from beneath two-thirds costa to three-fifths dorsum; discal dot represented by a very fine, short, transverse streak, running into costal streak; cilia deep-ochreous, on dorsum green. Hindwings with termen angled on vein 4; colour as forewings; a distinct, narrow, transversely elongate ochreous discal dot; a finely dentate, whitish-ochreous posterior line; cilia as forewings, but ochreous also on dorsum.

Type in Coll., *Turner*.

Q., Stradbrooke Island, in October. Six specimens, beaten from *Banksia serratifolia*.

EUCHLORIS ARGOSTICTA, n. sp.

(*Argostictos*, speckled with white.)

Male, female, 24-30 mm. Head and fillet green; face green, margins narrowly white. Palpi green, towards base whitish. Antennæ whitish, towards base green; in male with very long pectinations (10), apical third simple. Thorax green; collar white. Abdomen green, with some white median dots on dorsum, better marked in female, towards apex whitish. Legs whitish; femora barred anteriorly with green, tibiæ and tarsi with fuscous. Forewings triangular, costa gently arched, apex tolerably pointed, termen slightly rounded, oblique; green, with fine, white, transverse strigulæ, rather sparsely distributed; a fine shining white costal streak; a fuscous discal dot, bordered with whitish, slightly beyond middle; cilia green, apices whitish. Hindwings with termen rounded; colour and markings as forewings.

Type in Coll., *Turner*.

N.Q., Townsville; in January, February, and July. Three specimens, received from Mr. F. P. Dodd.

EUCHLORIS TANYGONA, n. sp.

(*Tanugonos*, long-angled; in allusion to hindwings.)

Male, 26 mm. Head green; fillet snow-white; face ochreous, upper edge brownish-ochreous. Palpi brownish-ochreous. Antennæ white; in male with rather long pectinations (5), apical fifth simple. Thorax green; abdomen green; sides and inferior surface whitish. Legs whitish; anterior tibiæ and tarsi brownish tinged. Forewings triangular, costa moderately arched, apex round-pointed, termen slightly crenulate, slightly bowed, oblique; rather dull green; costal edge near base brownish-ochreous, thence narrowly white; a circular, brownish-fuscous dot in disc at one-third; two similar dots on dorsum

at and before middle; a brownish-fuscous terminal line; cilia white, barred with brownish-fuscous, opposite veins. Hind-colour markings and cilia as forewings, but discal dot larger, and only one dot on dorsum.

Type in Coll., *Turner*.

Q., Mount Tambourine: in November. One specimen.

EUCHLORIS THALASSICA, n. sp.

(*Thalassikos*, sea-green.)

Female, 22 mm. Head dull green: face whitish, above greenish tinged: fillet narrowly white. Palpi rather long (2), ascending: whitish. Antennæ fuscous, towards base white. Thorax and abdomen dull green. Legs whitish; anterior pair greenish tinged. Forewings triangular, costa strongly arched at base, thence nearly straight, apex round-pointed, termen bowed, oblique: dull green; a few minute fuscous dots on costa: a very faint darker-green discal dot at one-third: a faint, wavy, whitish line from two-thirds costa to two-thirds dorsum; cilia pale green. Hindwings with termen angled and produced in a strong tooth on vein 4; colour and cilia as forewings: a well-marked, transversely elongate, dark green discal dot at one-sixth: a faint, whitish, straight, transverse line before middle. Under side pale green, with fuscous green discal dots, and a broad, subterminal fascia, not quite reaching costa of forewing and inner margin of hindwing.

Type in Coll., *Turner*.

N.Q., Kuranda: in March. One specimen, received from Mr. F. P. Dodd.

EUCHLORIS LEUCOSPILOTA, n. sp.

(*Leucospilotos*, spotted with white.)

Male, 24 mm. Head white; face whitish, upper portion green. Palpi moderate ($1\frac{1}{4}$); whitish, upper surface of second joint green. Antennæ whitish-ochreous, base of shaft white: in male with very long pectinations (10), apical two-fifths simple. Thorax and abdomen green, spotted with white. Legs white: anterior and middle pairs greenish anteriorly. Forewings triangular, costa moderately arched, apex rounded, termen slightly wavy, rounded, oblique; green, with numerous large white spots, more or less confluent, towards termen these form two broadish fasciæ, separated by a green line: cilia whitish, mixed with green. Hindwings with termen wavy, toothed on vein 6, and again more prominently on vein 4; colour, spots, and cilia as forewings. Under side white.

Type in Coll., *Turner*.

N.Q., Kuranda: in March. One specimen, received from Mr. F. P. Dodd.

EUCHLORIS CALLISTICTA, n. sp.

(*Callistiktos*, beautifully spotted.)

Male, 23 mm. Head green; face white, upper third green. Palpi moderate (1½), ascending; whitish. Antennæ white, apices and pectinations fuscous; in male with moderate pectinations (3), apical two-fifths simple. Thorax and abdomen green, with white spots. Legs white; anterior pair broadly barred with fuscous anteriorly. Forewings triangular, costa moderately arched, apex rounded, termen crenulate, rounded, oblique; green, irrorated with white (green hair scales on a white ground); costa narrowly fuscous, speckled with white; a subterminal series of white spots, succeeded by a few submarginal spots: a terminal series of white dots; cilia green. Hindwings with termen dentate, rounded; colour, spots, and cilia as forewings, but with less white irroration towards base and more numerous spots. Underside whitish; costa of forewings fuscous.

Type in Coll., *Turner*.

N.Q., Kuranda; in March. One specimen, received from Mr. F. P. Dodd.

EUCHLORIS VERTUMNARIA.

Mr. D. Goudie has bred this species from larvæ feeding on *Acacia hakeoides*.

PSEUDOTERPNA BRYOPHANES, n. sp.

(*Bruophanes*, like moss, moss-green.)

Female, 35 mm. Head and face whitish-ochreous, mixed with green. Palpi dark fuscous, towards base beneath whitish-ochreous. Antennæ ochreous-whitish, with some blackish scales towards base. Thorax green, with a transverse, dark fuscous line behind collar. Abdomen ochreous-whitish, with a few dark fuscous scales. Legs ochreous-whitish, annulated with dark fuscous. Forewings triangular, costa straight nearly to apex, apex rounded, termen wavy, rounded, oblique; green, mixed with whitish-ochreous, the latter preponderating towards base and on veins; markings blackish; numerous dots on costa; an interrupted basal line; a rather diffused line from one-quarter costa to one-third dorsum; several dots beneath mid-costa representing a narrow, transversely elongate discal spot; a line from three-quarters costa obliquely outwards, bent in disc to form an obtuse, twice-angled projection, thence inwardly oblique and slightly dentate to before mid-dorsum; some scattered blackish scales beyond posterior line; an interrupted terminal line thickened between veins; cilia green, mixed with whitish-ochreous, and interrupted with fuscous. Hindwings with

termen crenulate, rounded; veins 6 and 7 separate; colour and markings as forewings, but basal and antemedian line absent. Under surface ochreous-whitish, with dark grey lines as on upper surface; posterior part of disc faintly reddish and irrorated with dark grey.

Type in Coll., *Turner*.

Q., Sandgate (?), near Brisbane. One specimen. There is a doubt as to the locality, as the friend from whom I received it had been recently visiting Gayndah, and might have taken it there, but he thinks not.

PSEUDOTERPNA MYRIOSTICTA, n. sp.

(*Muriostiktos*, many-speckled.)

Female, 34 mm. Head whitish; face rounded and rather prominent, lower third and a transverse line above middle blackish. Palpi fuscous, lower surface of basal and second joints whitish. Antennæ pale grey, with some fuscous scales in basal half. Thorax and abdomen white, sparsely irrorated with black scales. Legs fuscous; tarsi annulated with whitish; posterior pair whitish. Forewings triangular, costa arched near base and apex, apex rounded, termen wavy, rounded, oblique; white, with scattered, dark fuscous scales; towards costa ochreous-whitish; an interrupted basal fascia; a broad, dark fuscous fascia, containing some reddish scales, at one-quarter, closely followed by a slender looped dark fuscous line; a black linear discal mark beneath mid-costa; a second suffused fascia, like the first, from five-sixths costa to three-quarters dorsum, interrupted above dorsum, where it is preceded by a slender, dark fuscous line; to this succeeds a dentate white subterminal line, edged posteriorly with dark fuscous; a terminal series of black dots between veins; cilia white. Hindwings with termen wavy, rounded; veins 6 and 7 separate; colour and irroration as forewings, but without fasciæ; a line of raised scales in disc anteriorly white, posteriorly black, represents the discal spot, and is continued to mid-dorsum. Under surface whitish, washed with pale reddish; a broad terminal blackish band; discal dot of forewings large, oval, black, of hindwings minute.

Type in Coll., *Turner*.

Q., Eumundi, near Nambour; in November. One specimen.

Sub-Family, MONOCTENIANÆ

TAXEOTIS ACROTHECTA, n. sp.

(*Acrothektos*, sharp-pointed.)

Male, female, 21-24 mm. Head grey-whitish; face dark fuscous. Palpi rather short (1¼); dark fuscous. Antennæ

whitish, in male dentate, shortly ciliated ($\frac{2}{3}$). Thorax and abdomen grey-whitish, with a very few dark fuscous scales. Legs whitish, sparsely irrorated with fuscous. Forewings triangular, costa straight, slightly arched close to base and apex, apex acute, slightly produced, termen sinuate, oblique; 11 connected with 12; grey-whitish, with a few scattered dark fuscous scales; a transverse line at one-quarter in female, in male scarcely indicated; a dark fuscous discal dot beneath mid-costa; a ferruginous-fuscous line from beneath four-fifths costa to three-quarters termen; in male interrupted; followed immediately by a whitish line, best marked in female: a series of black, terminal dots: cilia grey-whitish. Hindwings with termen rounded: colour and markings as forewings, but without basal line.

Type in Coll., *Turner*.

N.Q., Townsville: in August. Three specimens, received from Mr. F. P. Dodd.

TAXEOTIS ORPHNINA, n. sp.

(*Orphninos*, dusky.)

Male, 23 mm. Head grey; face dark fuscous. Palpi moderate ($1\frac{1}{2}$); dark fuscous. Antennæ ochreous whitish; in male distinctly laminate, with rather long ciliations (2). Thorax grey. Abdomen pale grey, with a few fuscous scales. Legs whitish; anterior and middle pairs irrorated with fuscous. Forewings triangular, costa gently arched, apex acute, termen sinuate, oblique; 11 connected with 12; pale grey, with a few scattered black scales; costal edge ochreous-whitish; a dark fuscous spot on costa at one-third, and another at two-thirds; a black discal dot beneath mid-costa; a ferruginous-fuscous interrupted line from beneath four-fifths costa to three-quarters dorsum; a fuscous spot near dorsum posterior to this; a series of blackish terminal dots; cilia grey whitish. Hindwings termen rounded: as forewings, but lines obsolete.

Female, 23 mm., differs in having the wings uniformly suffused with fuscous.

Type in Coll., *Turner*.

Q., Mount Tambourine: in March. Two specimens.

TAXEOTIS ADELPHA, n. sp.

(*Adelphos*, brotherly, closely akin.)

Male, 23 mm. Head grey; face dark fuscous. Palpi moderate ($1\frac{2}{3}$): dark fuscous. Antennæ grey-whitish; in male scarcely laminate, with short ciliations ($\frac{2}{3}$). Thorax grey. Abdomen [broken]. Legs whitish, irrorated with fuscous. Forewings triangular, costa gently arched, apex toler-

ably acute, termen rounded, oblique; 12 free; pale grey, with sparsely scattered black scales; costal edge ochreous-whitish; a fuscous spot on costa at one-third, and another at two-thirds; two or three dots connecting first costal spot with dorsum; a fuscous discal dot beneath mid-costa; a sinuate, ferruginous-fuscous line from beneath four-fifths costa to three-quarters dorsum; preceded by some dark fuscous dots, and succeeded by dark fuscous irroration and a series of dark fuscous spots; a series of black terminal dots; cilia pale grey. Hindwings with termen rounded; as forewings, but lines obsolete.

Extremely similar to the preceding, but readily distinguished by the male antennæ. The shape and neuration of forewings are also somewhat different.

Type in Coll., *Turner*.

N.S.W., Katoomba district; in February. One specimen.

TAXEOTIS EPIGAEA, n. sp.

(*Epigaios*, resting on the ground.)

Male, 38 mm. Head pale reddish-ochreous; face dark fuscous, tinged with ferruginous. Palpi rather short (1¼); dark fuscous; antennæ ochreous-fuscous; in male slightly laminate, with moderate ciliations (1). Thorax and abdomen pale reddish-ochreous; apical half of abdomen grey. Legs ochreous-whitish, irrorated with fuscous; anterior and middle tibiæ and tarsi dark fuscous anteriorly. Forewings triangular, costa nearly straight, apex tolerably acute, termen bowed, slightly oblique; 12 free: pale reddish-ochreous with dark fuscous irroration tending to form transverse strigulæ, a fuscous dot on costa at one-third and another at two-thirds; a slender, pale line from beneath four-fifths costa to three-quarters dorsum, preceded by a series of dark fuscous dots; a terminal series of dark fuscous dots: cilia pale reddish-ochreous. Hindwings with termen rounded: colour and markings as forewings.

The colour of this species harmonises with the red earth of the locality in which it was captured.

Type in Coll., *Turner*.

Q., Mount Tambourine; in November. One specimen.

Genus, PROROCRANIA.

(*Prorocranios*, prow-headed.)

Face with strong anterior convexity. Tongue well developed. Palpi rather long; second joint long, obliquely ascending; terminal joint short, porrect. Antennæ in male with a double series of pectinations extending nearly to apex,

outer pectinations longer than inner. Forewings rather elongate, 11 anastomosing with 10, 10 anastomosing with 8 and 9; 7, 8, 9 stalked. Hindwings with 6 and 7 connate.

PROROCRANIA ARGYRITIS, n. sp.

(*Arguritis*, silvery.)

Male, 38 mm. Head and palpi dark grey. Antennæ dark grey, with a rather long series of outer pectinations (5), and shorter inner pectinations (3). Thorax dark grey; inner edge of patagia blackish. Abdomen grey. Legs dark fuscous; posterior pair grey. Forewings elongate-triangular, costa straight except close to base and apex, apex rounded, termen rounded, strongly oblique; dark grey; a short, blackish streak from base, broadly dilated and dentate posteriorly, edged above with silvery white; an acutely dentate antemedian line, interrupted at costa and on mid-disc, blackish, edged with brownish and silvery white; veins before this marked with blackish streaks; a postmedian line from five-sixths costa, at first straight and inwardly oblique, then strongly dentate, and ceasing abruptly in mid-disc, silvery white, edged anteriorly with blackish; an interrupted dentate, blackish, subterminal shade; terminal veins with blackish streaks; a series of elongate, silvery white spots on termen, some of them bisected by black; cilia dark fuscous, barred with white. Hindwings rather elongate, termen nearly straight, except towards costa and tornus; pale grey; a grey discal dot in cell; cilia grey.

Type in Coll., *Turner*.

W.A., Albany; in August. One specimen, captured and presented to me by Mr. J. J. Walker.

NEARCHA URSARIA.

Panagra ursaria, Gn. Lep. x., p. 129.
Nearcha oxyptera, Low., Tr.R.S.S.A., 1903, p. 188.
Q., Brisbane, Stradbroke Island.

NEARCHA PROSEDRA, n. sp.

(*Prosedros*, sitting near, closely akin.)

Male, female, 29-32 mm. Head grey; face blackish. Palpi moderate (2½); blackish; towards base sharply white. Antennæ grey; in male with a double series of long pectinations (6). Thorax and abdomen grey. Legs grey; posterior pair whitish; in male posterior femora are fringed with long hairs on inferior surface, posterior tibiæ much dilated and grooved on internal surface. Forewings triangular, costa scarcely arched, apex pointed, termen gently sinuate, slightly oblique; grey, with a very few scattered fuscous scales; a transversely oval dark fuscous discal dot, with grey centre

beneath costa before middle; a fine sinuate whitish line from beneath three-quarters costa to three-quarters dorsum, preceded by a series of fine black dots, and succeeded by a broad, dark grey shade; a terminal series of black dots; cilia grey. Hindwings with termen rounded; in male with a large fovea in end of cell, preceded by a curled tuft of long, fuscous hairs, succeeded by a tuft of shorter fuscous hairs, and bounded internally by a high ridge of pale grey hairs; as forewings, but without markings or with a faint, pale transverse median line only.

The palpi are longer than in *buffalaria* (2), shorter than in *ursaria*. The male may be distinguished from *ursaria* by the absence of any hairy patch on the underside of forewings, and from *buffalaria* by the steep ridge of hairs on the inner side of the fovea on the hindwings.

Type in Coll., *Turner*.

Q., Stradbroke Island; in November and December. Eight specimens.

NEARCHA NEPHOCROSSA, n. sp.

(*Nephokrossos*, with cloudy border.)

Male, 32 mm. Head whitish-grey; face blackish. Palpi moderate (2); blackish; towards base sharply white. Antennæ grey, toward base mixed with white; in male with a double series of very long pectinations (10). Thorax and abdomen whitish-grey. Legs grey; [posterior pair broken]. Forewings triangular, costa straight, except close to base and apex, apex rounded, termen bowed, oblique; whitish-grey, rather closely irrorated with dark grey; a dark fuscous streak along costa from base to one-quarter; a pale transverse line at one-quarter; a fuscous discal spot beneath costa before middle; a clearly defined, sinuate, whitish-grey line from three-fifths costa to three-quarters dorsum; preceded by a series of dark fuscous dots; and succeeded by a broad, dark grey fascia, its outer edge crenate; terminal part of disc whitish-grey, with a series of suffused fuscous spots; a terminal series of black dots; cilia whitish-grey. Hindwings with termen rounded; in male without tufts beneath; dark grey; with two transverse, pale grey lines, one median, one subterminal; terminal dots and cilia as forewings.

Type in Coll., *Turner*.

Q., Burpengary, near Brisbane; in April. One specimen.

Gen. ZEUCTOPHLEBIA.

Zeuctophlebia, Warr., Nov., Zool., 1896, p. 355.

Face without projecting tuft. Tongue present. Palpi moderate (1½), porrect, terminal joint very short. Antennæ of male with a double row of long pectinations, apical one-

sixth simple. Forewings with 7, 8, 9, 10 stalked, 11 anastomosing with 12, 10 arising from 11, beyond anastomosis, and anastomosing with 9, forming a single areole. Hindwings with 6 and 7 separate.

Type, *Z. rufipalpis*.

ZEUCTOPHLEBIA RUFIPALPIS.

Zeuctophlebia rufipalpis, Warr., Nov. Zool., 1896, p. 355.

Q., Nambour, Brisbane, Toowoomba: from September to December.

ZEUCTOPHLEBIA TAPINODES, n. sp.

(*Tapinodes*, of humble appearance.)

Male, 24 mm. Head and palpi grey. Antennæ grey; in male with a double series of long pectinations (8), apical one-sixth simple. Thorax, abdomen, and legs grey. Forewings triangular, costa gently arched, apex round-pointed, termen bowed, oblique: pale grey sparsely irrorated with dark grey: costal edge dark grey in basal half; a dark fuscous discal dot beneath costa before middle; a very fine, dark, dentate line from three-quarters costa to three-quarters dorsum: a terminal series of fuscous dots; cilia pale grey. Hindwings with termen slightly wavy, rounded; colour and markings as forewings.

Type in Coll., *Turner*.

Q., Stradbroke Island. One specimen.

Genus, ENCRYPHIA, nov.

(*Encruphios*, hidden, concealed.)

Head flat, not tufted. Palpi moderate, porrect, densely haired, terminal joint concealed. Antennæ in male with a double row of moderate pectinations nearly to apex, each pectination bearing a terminal bristle. Posterior tibiæ in male dilated, with a groove on inner side, containing a long tuft of hairs from base. Forewings with 7, 8, 9, 10 stalked, 10 arising before 7, anastomosing with 11, and then with 8 and 9 forming a double areole, 11 anastomosing with 12. Hindwings with 6 and 7 connate or separate, 8 approximated to cell as far as middle.

ENCRYPHIA ARGILLINA, n. sp.

(*Argillinos*, like clay, clay-coloured.)

Male, female, 29-34 mm. Head ochreous-grey: face dark brown. Palpi moderate (1¾): dark brown. Antennæ dark grey: in female paler: in male with moderate pectinations (2), but appearing longer on account of the terminal bristles. Thorax and abdomen ochreous grey. Legs whitish, tinged

with reddish, and irrorated with dark fuscous; anterior pair in male fuscous. Forewings triangular, costa straight except close to base and apex, apex pointed, termen slightly rounded, slightly oblique; purplish- reddish- or ochreous-grey, with a few scattered, dark fuscous scales: a straight line from one-quarter costa to one-quarter dorsum, pale fuscous, sometimes edged anteriorly with pale ochreous, sometimes obsolete, or represented by two or three dark fuscous dots; a faint linear discal dot sometimes obsolete; a line similar to first from three-quarters costa to two-thirds dorsum, slightly bent in middle, sometimes represented by a series of dots: cilia concolorous. Hindwings with termen rounded; colour and markings as forewings, but without basal line and discal dot.

Type in Coll., *Turner*.

N.Q., Townsville; in July (Dodd). Q., Brisbane, Dalby. Seven specimens.

Genus, SYSTATICA, nov.

(*Systatikos*, connecting.)

Face smooth. Tongue well developed. Palpi ascending, reaching vertex, densely haired, terminal joint concealed. Antennæ in male with a single row of pectinations on outer side, apical one-sixth simple. Legs smooth, posterior and middle tarsi with a few spinules. Forewings with 7, 8, 9 stalked, 10, 11 stalked, 10 closely approximated to 9, but not connected, 12 free. Hindwings with 6 and 7 separate.

Type *S. xanthastis*. This genus forms a connecting link between *Epidesmia* and *Monoctenia*.

SYSTATICA XANTHASTIS.

Monoctenia (?) xanthastis, Low., Tr.R.S.S.A., 1894, p. 85.

Q., Gympie, Mount Tambourine; in March. Two specimens.

Genus, HOMOSPORA, nov.

(*Homosporos*, of the same ancestry.)

Face with strong, obtuse, conical chitinous projection. Tongue well developed. Antennæ in male bipectinated to apex. Palpi moderate, subascending; terminal joint very short. Thorax stout, densely rough-haired beneath. Legs without tarsal spines; anterior tibiæ densely tufted with long hairs beneath; posterior tibiæ without middle spurs. Forewings with 3 and 4 from angle of cell, 6 from upper angle, 7, 8, 9 stalked, 10 connected by a bar with 8 and 9 beyond 7, 11 free. Hindwings with 5 from above middle of cell, 6 and 7 connate.

Allied to *Arrhodia*, Gn., from which it differs in the frontal projection, absence of hook on anterior tibiæ, and connection of vein 10 of forewings with 8 and 9.

edge paler; a whitish-ochreous wavy line from beneath one-third costa to two-fifths dorsum; a similar line from beneath two-thirds costa to three-fifths dorsum; discal dot represented by a very fine, short, transverse streak, running into costal streak; cilia deep-ochreous, on dorsum green. Hindwings with termen angled on vein 4; colour as forewings; a distinct, narrow, transversely elongate ochreous discal dot; a finely dentate, whitish-ochreous posterior line; cilia as forewings, but ochreous also on dorsum.

Type in Coll., *Turner*.

Q., Stradbrooke Island, in October. Six specimens, beaten from *Banksia serratifolia*.

EUCHLORIS ARGOSTICTA, n. sp.

(*Argostictos*, speckled with white.)

Male, female, 24-30 mm. Head and fillet green; face green, margins narrowly white. Palpi green, towards base whitish. Antennæ whitish, towards base green; in male with very long pectinations (10), apical third simple. Thorax green; collar white. Abdomen green, with some white median dots on dorsum, better marked in female, towards apex whitish. Legs whitish; femora barred anteriorly with green, tibiæ and tarsi with fuscous. Forewings triangular, costa gently arched, apex tolerably pointed, termen slightly rounded, oblique; green, with fine, white, transverse strigulæ, rather sparsely distributed; a fine shining white costal streak; a fuscous discal dot, bordered with whitish, slightly beyond middle; cilia green, apices whitish. Hindwings with termen rounded; colour and markings as forewings.

Type in Coll., *Turner*.

N.Q., Townsville; in January, February, and July. Three specimens, received from Mr. F. P. Dodd.

EUCHLORIS TANYGONA, n. sp.

(*Tanugonos*, long-angled; in allusion to hindwings.)

Male, 26 mm. Head green; fillet snow-white; face ochreous, upper edge brownish-ochreous. Palpi brownish-ochreous. Antennæ white; in male with rather long pectinations (5), apical fifth simple. Thorax green; abdomen green; sides and inferior surface whitish. Legs whitish; anterior tibiæ and tarsi brownish tinged. Forewings triangular, costa moderately arched, apex round-pointed, termen slightly crenulate, slightly bowed, oblique; rather dull green; costal edge near base brownish-ochreous, thence narrowly white; a circular, brownish-fuscous dot in disc at one-third; two similar dots on dorsum

at and before middle; a brownish-fuscous terminal line; cilia white, barred with brownish-fuscous, opposite veins. Hind-colour markings and cilia as forewings, but discal dot larger, and only one dot on dorsum.

Type in Coll., *Turner*.

Q., Mount Tambourine: in November. One specimen.

EUCHLORIS THALASSICA, n. sp.

(*Thalassikos*, sea-green.)

Female, 22 mm. Head dull green: face whitish, above greenish tinged; fillet narrowly white. Palpi rather long (2), ascending; whitish. Antennæ fuscous, towards base white. Thorax and abdomen dull green. Legs whitish; anterior pair greenish tinged. Forewings triangular, costa strongly arched at base, thence nearly straight, apex round-pointed, termen bowed, oblique; dull green; a few minute fuscous dots on costa; a very faint darker-green discal dot at one-third; a faint, wavy, whitish line from two-thirds costa to two-thirds dorsum; cilia pale green. Hindwings with termen angled and produced in a strong tooth on vein 4; colour and cilia as forewings; a well-marked, transversely elongate, dark green discal dot at one-sixth; a faint, whitish, straight, transverse line before middle. Under side pale green, with fuscous green discal dots, and a broad, subterminal fascia, not quite reaching costa of forewing and inner margin of hindwing.

Type in Coll., *Turner*.

N.Q., Kuranda: in March. One specimen, received from Mr. F. P. Dodd.

EUCHLORIS LEUCOSPILOTA, n. sp.

(*Leucospilotos*, spotted with white.)

Male, 24 mm. Head white; face whitish, upper portion green. Palpi moderate ($1\frac{1}{4}$); whitish, upper surface of second joint green. Antennæ whitish-ochreous, base of shaft white; in male with very long pectinations (10), apical two-fifths simple. Thorax and abdomen green, spotted with white. Legs white; anterior and middle pairs greenish anteriorly. Forewings triangular, costa moderately arched, apex rounded, termen slightly wavy, rounded, oblique; green, with numerous large white spots, more or less confluent, towards termen these form two broadish fasciæ, separated by a green line: cilia whitish, mixed with green. Hindwings with termen wavy, toothed on vein 6, and again more prominently on vein 4; colour, spots, and cilia as forewings. Under side white.

Type in Coll., *Turner*.

N.Q., Kuranda: in March. One specimen, received from Mr. F. P. Dodd.

HOMOSPORA PROCRITA, n. sp.

(*Procritos*, preferred, esteemed.)

Male, 42 mm. Head and palpi whitish. Antennæ whitish; pectinations in male ochreous, long (5). Thorax grey-whitish, anteriorly whitish-ochreous. Abdomen [broken]. Legs whitish; on upper surface fuscous irrorated, and tarsi annulated, with whitish. Forewings elongate-triangular, costa nearly straight, apex rounded, termen nearly straight, oblique; grey ochreous-whitish, with scattered fuscous scales, which in places tend to form transverse strigulæ; an interrupted fuscous line along basal fourth of costa; a triangular fuscous spot on one-quarter costa, from which proceeds a fine, deeply-waved line to one-quarter dorsum; a straight, broad fuscous transverse shade just beyond middle, a finely dentate, nearly straight, fuscous line from three-quarters costa to three-quarters dorsum; cilia whitish, broadly barred with dark fuscous on middle part of termen. Hindwings with termen rounded; whitish, towards apex washed with pale reddish-purple; a fuscous apical blotch; some fuscous scales towards tornus and about mid-disc; traces of a dentate fuscous postmedian line; cilia whitish, towards apex barred with fuscous.

Type in Coll., *Turner*.

N.Q., Townsville: in March. One specimen received from Mr. F. P. Dodd, in good condition, except abdomen.

Sub-Family, SELIDOSEMINÆ.

ECTROPIS HEMIPROSOPA, n. sp.

(*Hemiprosopos*, half-faced, half-masked.)

Male, female, 32-40 mm. Head grey-whitish; face with a broad median transverse dark fuscous bar. Palpi grey-whitish, external surface fuscous. Antennæ grey-whitish, apices and pectinations darker; in male with very long pectinations (8), apical third simple; most of the pectinations are forked at extremity, many are double from point of origin, and towards apex a few may be simple throughout; in female simple. Thorax whitish-grey. Abdomen whitish-grey, with some fuscous scales and a double series of dorsal fuscous dots. Legs whitish; anterior pair fuscous. Forewings elongate-triangular, costa moderately arched, apex round-pointed, termen nearly straight, more rounded in female, oblique; whitish-grey or whitish in female, finely irrorated with fuscous; dark fuscous dots on costa at one-third, one-half, and two-thirds; a fine dentate outwardly angled line from first costal dot to one-third dorsum, usually obsolete; a dot in disc beneath second costal dot; an interrupted line of more or less

discrete, dark fuscous dots from third costal dot to three-fifths dorsum, slightly outwardly curved above; a series of submarginal dots usually incomplete: a series of black, terminal dots; cilia whitish. Hindwings with termen rounded, more or less dentate; colour and markings as forewings, but with discal dot annular, pale centred.

This species appears to be most allied to *E. camelaria*, Gn., but the antennal structure is peculiar, and apparently intermediate between *Ectropis* and *Selidosema*.

Type in Coll., *Turner*.

N.Q., Geraldton, Townsville; in April and May. Q., Brisbane; in March and April. Seven specimens.

SELIDOSEMA SYMMORPHA, n. sp.

(*Symmorphos*, of similar appearance.)

Male, female, 27-31 mm. Head whitish; face with a transverse fuscous bar below middle, leaving lower edge narrowly whitish. Palpi moderate (1½); pale fuscous. Antennæ grey, towards base whitish; in male with very long pectinations (10), apical fifth simple; in female simple. Thorax whitish. Abdomen whitish, with two transverse fuscous lines before middle. Legs grey annulated with whitish; posterior pair whitish. Forewings elongate-triangular, costa slightly arched, apex round-pointed, termen rounded, strongly oblique; 10 and 11 stalked or 11 absent; whitish, markings fuscous; costa with minute strigulæ and larger dots at one-third and beyond middle; a very fine line from first dot forming a prominent angle outwards beneath costa, then inwardly oblique to one-quarter dorsum, a discal dot beneath mid-costa; a fine interrupted wavy line from three-quarters costa to three-fifths dorsum; a faint, dentate, wavy, subterminal line, preceded by fuscous suffusion, a terminal series of black dots; cilia whitish. Hindwings with termen rounded, slightly crenate: colour and markings as forewings.

Extremely similar to *S. cognata*, Wlk.: the female may be readily distinguished by the simple antennæ, the male by the more broadly whitish forehead and slightly longer palpi.

Type in Coll., *Turner*.

N.Q., Townsville: in February. Three specimens received from Mr. F. P. Dodd. Q., Brisbane; one female, in February.

SELIDOSEMA LEUCODESMA, n. sp.

(*Leucodesmos*, with white chain or rosary.)

Female, 36 mm. Head, palpi, and antennæ fuscous-brown; antennæ in female simple. Thorax fuscous-brown, with a dark fuscous bar across patagia. Abdomen fuscous-

brown. Legs dark fuscous, irrorated and tarsi annulated with whitish; posterior pair mostly whitish. Forewings elongate-triangular, costa straight except close to base and apex, apex rounded, termen crenulate, bowed, oblique; vein 10 free, 11 absent: fuscous-brown, irrorated with dark fuscous; a fine, dark fuscous line from one-third costa to one-third dorsum, giving off near dorsum an oblique streak towards base of dorsum; a slightly darker median shade; an interrupted dark fuscous line from two-thirds costa, bent inwards in disc, and again bent to end in mid-dorsum; a conspicuous, dentate, interrupted, white, subterminal line; a fine, blackish, terminal line; cilia brownish. Hindwings with termen markedly dentate, rounded; colour and markings as forewings, but basal line and median shade absent. Under side whitish, with large, circular, fuscous, discal spot and terminal fuscous suffusion on each wing, with a whitish, apical spot on forewing.

Type in Coll., *Turner*.

N.Q., Kuranda; in February. One specimen received from Mr. F. P. Dodd.

SCIOGLYPTIS EMMELODES, n. sp.

(*Emmelodes*, elegant, harmonious.)

Male, 39 mm. Head ochreous-whitish; lower half of face irrorated with fuscous; face with a small, acute, anterior projection on lower edge. Palpi moderate ($1\frac{1}{2}$); ochreous-whitish, towards apex irrorated with fuscous. Antennæ pale grey; in male with moderately long pectinations (6), anterior one-fifth simple. Thorax with a slight posterior crest; ochreous-whitish; abdomen ochreous-whitish, anteriorly with a few dark fuscous scales. Legs whitish, irrorated with dark fuscous: anterior tibiæ in male with a tuft of hairs on posterior surface: posterior tibiæ in male somewhat dilated. Forewings triangular, costa nearly straight, apex rounded, termen bowed, oblique: fovea in male large: 10 and 11 stalked, 11 anastomosing with 12; ochreous-whitish; costa strigulated with fuscous; a fine, fuscous line from one-quarter costa to one-sixth dorsum, best marked near dorsum; a nearly straight fuscous line from one-third costa to one-third dorsum, followed by a broadly diffused brownish shade: a dark fuscous discal dot beneath mid-costa; a three times angulated whitish line from three-quarters costa to mid-dorsum, edged with fuscous, very incompletely on anterior aspect, better on posterior, above middle of disc posterior edge is thickened, and followed by a brownish line; a dentate whitish subterminal line; posterior part of disc suffused with pale brownish

and minutely but sparsely strigulated with fuscous; a terminal series of dark fuscous dots; cilia whitish. Hindwings with termen rounded: whitish; a dark fuscous median discal dot; terminal and dorsal areas suffused with pale brownish and strigulated with fuscous: an interrupted, dark fuscous, terminal line; cilia whitish. Under surface ochreous-whitish, with dark fuscous discal dots and fuscous subapical suffusions.

Type in Coll., *Turner*.

Q., Wynnum, near Brisbane: in August. One specimen.

Genus, PLEUROLOPHA, nov.

(*Pleurolophos*, side-crested.)

Face smooth. Tongue well developed. Palpi moderate, obliquely ascending. Antennæ in male simple, moderately ciliated in tufts. Thorax smooth. Abdomen with four pairs of hair-crests, one on each side of fifth, sixth, seventh, and eighth segments, those on sixth and seventh largest. Fore tibiæ in male with a small tuft of hairs from middle of posterior surface. Forewings in male with large fovea: vein 10 free, 11 stalked or absent. Hindwings normal.

This genus belongs to the *Selidosema* section of the subfamily, and is characterised by the curious abdominal side-crests.

PLEUROLOPHA NEBRIDOTA, n. sp.

(*Nebridotos*, fawn-coloured.)

Male, 36 mm. Head, palpi, thorax, and abdomen brown. Antennæ brownish: ciliations in male, 1½. Legs pale ochreous; anterior pair brownish. Forewings elongate-triangular, costa nearly straight, apex rounded, termen crenulate, bowed, oblique: 11 absent: reddish-brown: costa strigulated with pale fuscous: traces of an inwardly oblique line from one-third costa to one-sixth dorsum: an interrupted, dark fuscous line from two-thirds costa to mid-dorsum; an ill-defined, pale, subterminal line: a terminal series of dark fuscous dots: cilia brown. Hindwings with termen dentate, rounded: colour and markings as forewings. Under side without markings.

Type in Coll., *Turner*.

Q., Brisbane. One specimen.

Genus, ORSONOBA.

Orsonoba, Wlk., Brit. Mus. Cat. xx., p. 218.
Hmps., Moths Ind. iii., p. 211.

Sir George Hampson makes this synonymic with *Gonodontis*, Hb., which I should have adopted as the older name, but that I have some doubt as to whether it is congeneric: it is

certainly nearly allied. *Proboloptera*, Meyr. (P.L.S. N.S.W., 1891, p. 641), is also closely allied, if really distinct.

ORSONOBA CLELIA.

Orsonoba clelia, Cram., Pap. Exot., iii., p. 172, pl. cclxxxviii., b. c. Hmps., Moths Ind., iii., p. 212.

Q., Gympie (Illidge). Also from Borneo, Ceylon, and India.

ORSONOBA ZAPLUTA, n. sp.

(*Zaploutos*, rich.)

Female, 54-56 mm. Head and palpi grey, purplish-grey, or reddish-grey; face with a pair of lateral, whitish spots. Antennæ grey. Thorax and abdomen stout; grey, sometimes reddish tinged. Legs grey, irrorated with dark fuscous. Forewings elongate-triangular, costa straight to near apex, then strongly curved, apex rounded, termen with three slight, subapical dentations, then sigmoid, and with a rounded projection on tornus, dorsum convex in basal and strongly concave in terminal half: grey, whitish-grey, or reddish; a fuscous line from two-fifths costa, shortly outwardly oblique, then strongly bent inwards to one-third dorsum; a similar line from three-quarters costa to three-quarters dorsum, preceded beneath angle by a ferruginous suffusion, which sometimes contains hyaline spots free from scales; a short ferruginous shade from costa before apex, and a slight similar shade from tornus; cilia grey or reddish. Hindwings with costa strongly excavated in middle, short, no true apical angle, but a strongly projecting acute angle on vein 7, termen obtusely angled on vein 4, straight above and below angulation: colour as forewings: a small, hyaline, scale-less spot, bordered with fuscous on end of cell; a transverse, fuscous, or ferruginous line just beyond discal spot, sometimes succeeded by some hyaline spots resembling those on forewing.

A variable species, but easily recognised: the hyaline discal spot of hindwings is a good characteristic.

Type in Coll., *Turner*.

Q., Brisbane: in April and May. Three specimens.

ORSONOBA LUTEOLA, n. sp.

(*Luteolus*, yellowish.)

Male, 37 mm. Head ochreous: face with rounded projection, with a median pair of fuscous dots, beneath which is a brownish, transverse bar, lower edge whitish. Palpi ochreous, apex fuscous. Antennæ fuscous: in male bipectinated to apex, pectinations moderately long (4). Thorax whitish, anterior edge broadly fuscous. Abdomen whitish-ochreous

with a few scattered, dark fuscous scales. Legs whitish-ochreous, irrorated with dark fuscous. Forewings elongate-triangular, costa straight to near apex, apex rounded, termen anterior edge broadly fuscous. Abdomen whitish-ochreous, broad, fuscous streak on costa to one-third; costa thence strigulated with fuscous, with a larger spot at two-thirds; a fine, inwardly oblique, dark fuscous line from beneath one-third costa to one-quarter dorsum; two very short, outwardly oblique lines from mid-dorsum; a dark fuscous collection of strigulæ beneath apex, in which is a subapical, white spot; some similar strigulæ above tornus; cilia whitish ochreous, near apex fuscous. Hindwings with costa nearly straight, no true apex, an acute projecting angle on vein 7, and a stronger angle on vein 4; termen wavy between angles, but straight between second angle and tornus; colour as forewings, but lines obsolete. Underside with three, strong, oblique lines on forewings at about one-third, middle, and two-thirds; two angulated lines on hindwing not reaching dorsum.

Type in Coll., *Turner*.

Q., Brisbane; in September. One specimen.

ORSONOBA LEUCOPREPES, n. sp.

(*Leucoprepes*, with conspicuous whiteness.)

Male, 34 mm. Head grey, mixed with white; face with a strong, rounded, conical protuberance, grey, margins white. Palpi grey. Antennæ ochreous-whitish; in male bipectinated to apex, pectinations moderately long (5). Thorax grey. Abdomen grey, with a few dark fuscous scales. Legs pale grey. Forewings elongate-triangular, costa straight, apex rounded, termen bowed, oblique; grey; costa strigulated with dark fuscous; an interrupted fuscous line from five-sixths costa to three-fifths dorsum; preceded by two wedge-shaped, white blotches between veins 2 and 4, separated by vein 3, which is narrowly grey; some suffused, dark fuscous spots on costal half of termen; cilia grey. Hindwings with costa straight, no true apex, a slightly prominent angle on vein 7, and another better marked on vein 4, termen wavy between angles, straight between second angle and tornus; colour and markings as forewings, but with a single, rather irregular, white blotch towards dorsum.

The strongly projecting forehead is an exaggeration of the less-marked prominence in *luteola* and *clelia*.

Type in Coll., *Turner*.

Q., Dalby. One specimen.

Genus, CALLIPONA, nov.

(*Calliponos*, beautifully wrought.)

Face smooth, with a small, projecting tuft of hairs at lower extremity. Tongue well developed. Palpi porrect, rather long ($2\frac{1}{4}$); second joint covered with densely appressed hairs; terminal joint about one-fifth second; down-curved, smooth-scaled, tolerably pointed. Antennæ in male bipectinated, terminal fifth simple. Forewings in male with a small fovea; veins 7, 8, 9, 10 stalked. Hindwings with cell very short ($\frac{1}{6}$).

Perhaps allied to *Xenographia*, Warr. (P.Z.S., 1893, p. 404; Hmps., Moths Ind., iii., p. 189). The very short cell of hindwings is a noteworthy characteristic.

CALLIPONA METABOLIS, n. sp.

(*Metabolis*, variable.)

Male, female, 32-38 mm. Head and palpi greenish or reddish. Antennæ whitish, sometimes reddish, tinged; in male with rather long (6), fuscous dentations. Thorax and abdomen greenish or reddish. Legs fuscous or reddish, with white irroration. Forewings triangular, costa straight, gently arched towards base and apex, apex pointed, termen strongly bowed, slightly oblique: greenish, greenish-grey, reddish-grey, orange-reddish, or purplish-reddish: lines darker and varying with ground colour: a transverse line from one-sixth costa to one-sixth dorsum, sometimes scarcely traceable; a slightly curved line from mid-costa to mid-dorsum: a third line from three-quarters costa, more strongly outwardly curved to three-quarters dorsum, sometimes obsolete: sometimes a few generally scattered fuscous scales: cilia concolorous. Hindwings with costa strongly rounded, termen rounded; colour as forewings: median and postmedian lines as forewings: a more or less developed dark fuscous spot or blotch on postmedian line near costa. Under side yellowish-green or reddish, finely strigulated with fuscous, costal edge of forewing white, a triangular subapical white blotch on termen of forewing, also strigulated.

Very variable in colour, but otherwise constant, and easily recognised.

Type in Coll., *Turner*.

N.Q., Townsville: in July and August. Nine bred specimens received from Mr. F. P. Dodd.

DEILINIA ACROCOSMA, n. sp.

(*Acrocosmos*, with apical ornament.)

Male, 35 mm. Head fuscous-grey. Palpi pale ochreous. Antennæ fuscous-grey: in male with long pectinations (10),

apical eighth simple. Thorax and abdomen brownish. Legs brown-whitish; anterior and middle pairs fuscous anteriorly; anterior tibiæ in male with a tuft of long hairs from base on posterior surface. Forewings triangular, costa slightly arched, apex rounded, termen bowed, oblique; 7, 8, 9, 10 stalked, 11 free; in male without fovea; dull brownish; costa fuscous, with whitish irroration; three fine wavy, slightly darker brown, transverse lines at one-quarter, before middle, and at two-thirds; a dark fuscous discal dot beneath mid-costa, edged with pale scales: an oval whitish apical blotch containing some brownish scales; a terminal series of minute dark fuscous dots: cilia brownish. Hindwings with termen rounded; colour as forewings: a minute, whitish, discal dot: an interrupted dentate, whitish, subterminal line; cilia as forewings.

Type in Coll., *Turner*.

Q., Stradbroke Island: in April. One specimen.

DEILINIA CATHARODES, n. sp.

(*Catharodes*, neat-looking.)

Female, 36 mm. Head, palpi, antennæ, thorax, and abdomen, whitish-brown. Legs pale fuscous; posterior pair whitish. Forewings elongate-triangular, costa moderately arched, apex tolerably pointed, termen slightly bowed, oblique; 7, 8, 9, 10 stalked, 11 arising separately and anastomosing with 12: whitish-brown, with a few scattered fuscous scales, in places tending to form strigulæ; a faintly darker slightly curved transverse line at one-fifth; a dark fuscous discal dot at two-fifths: succeeded by a rather broad, brownish line from mid-costa to mid-termen: a similar but finer line from three-fifths costa to three-quarters termen; a sub-terminal series of dark fuscous dots on veins: a terminal series of dark fuscous dots between veins: cilia whitish-brown. Hindwings with termen slightly rounded, dentate; colour and markings as forewings.

Recalling some of the *Sterrhinæ* in superficial appearance.

Type in Coll., *Turner*.

T., Hobart. One specimen.

GASTRINA CATASTICTA, n. sp.

(*Catastiktos*, speckled.)

Female, 37 mm. Head white, with a median fuscous dot; face dark fuscous, margins narrowly white. Palpi moderate (1¼); white; second joint with median and subapical dark fuscous rings. Antennæ fuscous. Thorax white, spotted with dark fuscous. Abdomen ochreous-whitish, with a fuscous spot on dorsum of each segment: crests anteriorly white.

Forewings elongate-triangular, costa moderately arched, apex rounded, termen bowed, slightly oblique; 10 arising from cell, connected with 8 and 9, beyond 7, 11 free; white, speckled with dark fuscous; veins partly slenderly outlined with ochreous; markings dark fuscous: a transverse basal line; a dentate line from one-fifth costa to one-quarter dorsum, thickened on costa; a somewhat dentate line from costa before middle to mid-dorsum; a short, linear, transverse discal spot just beyond this; a broad, subterminal line broadly interrupted in disc: a submarginal spot above middle: a terminal series of blackish wedge-shaped spots; cilia white, interrupted by fuscous opposite veins. Hindwings with termen rounded; grey, paler towards base: two white lines from tornus, lost in disc: cilia as forewings.

Differing from the type species slightly in neuration, but agreeing in other respects.

Type in Coll., *Turner*.

Q., Mount Tambourine; in November. One specimen. There is another from the same locality in Coll., *Illidge*.

Genus, CRYPTOSCOPA, nov.

(*Cryptoscopos*, hidden, inconspicuous.)

Face flat. Tongue well developed. Palpi short, not projecting beyond frons; second joint densely rough scaled, terminal joint concealed. Antennæ in male simple, with extremely short ciliations ($\frac{1}{4}$). Thorax with a slight posterior crest. Posterior tibiæ of male somewhat dilated, with a tuft of hairs from inner side of base, middle spurs well developed, terminal spurs very short. Forewings in male with a large, oval, shallow fovea near base; 10 and 11 stalked, 10 anastomosing with 9. Hindwings normal.

CRYPTOSCOPA APREPES, n. sp.

(*Aprepes*, unadorned, inconspicuous.)

Male, female, 22-28 mm. Head, palpi, antennæ, thorax, and abdomen dark fuscous. Legs dark fuscous, irrorated, and tarsi annulated with whitish. Forewings triangular; costa straight, slightly arched towards apex, apex rounded, termen slightly bowed, slightly oblique: dark fuscous: two fine, transverse, slightly outwardly curved, blackish lines, first from one-third costa to one-third dorsum, second from beyond mid-costa to beyond mid-dorsum: cilia fuscous. Hindwings with termen rounded: fuscous, towards base paler; a darker transverse line from tornus nearly to costa; cilia fuscous.

Type in Coll., *Turner*.

N.Q., Geraldton: in May. Q., Brisbane; in February. Three specimens.

Family, LASIOCAMPIDÆ.

The following five genera, which are closely allied, may be distinguished as follows:—

A. Forewings with 6, 7, and 8 stalked.
Pinara, Wlk.. iii., p. 761. Type, *cana*, Wlk.
AA. Forewings with 8 separate.
B. Palpi long, over 3 times breadth of eye.
C. Hindwings with 4 and 5 stalked.
Entometa, Wlk., iv. p. 972. Type, *marginata*, Wlk.
CC. Hindwings with 4 and 5 separate.
Opsirhina, Wlk., vi., p. 1418. Type, *albigutta*, Wlk.
BB. Palpi moderate, not more than twice the breadth of eye.
C. Hindwings with 4 and 5 stalked.
Symphyta, Turn., Tr.R.S.S.A., 1902, p. 187. Type, *psaropis*, Turn.
CC. Hindwings with 4 and 5 separate.
Clathe, Wlk., v., p. 994. Type, *arida*, Wlk.

In all these genera vein 7 of the hindwings arises from near the base of cell, and almost immediately anastomoses very shortly with vein 8; in this they differ from the genera, of which *Odonestis*, Germar, is a representative.

ENTOMETA SPODOPA, n. sp.

(*Spodopos*, ashen.)

Male, 40 mm. Head, thorax, palpi, antennæ, abdomen, and legs whitish-grey, slightly ochreous tinged. Forewings triangular, costa nearly straight, apex rounded, termen strongly bowed, scarcely oblique; whitish-grey, slightly ochreous tinged; markings pale fuscous; a discal dot before middle; a fine, slightly dentate line from two-thirds costa to mid-dorsum; a less distinct but broader and interrupted line from apex to before tornus; cilia pale fuscous, slightly reddish tinged. Hindwings with termen strongly rounded; vein 3 connate or short stalked; pale grey, slightly darker than forewings: cilia whitish-grey.

Type in Coll., *Turner*.

Q., Brisbane; in May. Two specimens.

ENTOMETA PLINTHOPA.

(*Plinthopos*, brick-coloured.)

Male, 36 mm. Head, thorax, palpi, antennæ, abdomen, and legs pale reddish-ochreous. Forewings triangular, costa straight, gently arched towards apex, apex rounded, termen straight, scarcely oblique; pale reddish-ochreous: markings fuscous: a line from one-quarter costa to one-quarter dorsum; a discal dot at one-third; a faintly marked line from mid-costa, at first outwardly curved, then strongly inwardly oblique to one-third dorsum; a line from apex to dorsum at two-thirds; cilia [denuded]. Hindwings with termen strongly rounded; vein 3 stalked: pale reddish; a fuscous suffusion on costa; cilia pale reddish.

Type in Coll., *Turner*.

N.Q., Townsville; in July. One specimen received from Mr. F. P. Dodd.

Genus, OPSIRHINA.

Opsirhina, Wlk., Brit. Mus. Cat. vi., p. 1418.

As *fervens*, the first species placed by Walker in this genus, belongs to the previously characterised *Entometa*, I hereby constitute *albigutta* the type.

OPSIRHINA ALBIGUTTA.

Opsirhina albigutta, Wlk., Brit. Mus. Cat. vi., p. 1419.

T., Hobart. One fine, bred specimen received from Mr. A. M. Lea.

SYMPHYTA CYCLOMELA.

Opsirhina cyclomela, Low., Tr.R.S.S.A., 1903, p. 183.

N.Q., Townsville. I have received a fine, bred pair from Mr. F. P. Dodd, who has found the larvæ feeding on *Eucalyptus*, *Careya*, and other trees.

Family, LIMACODIDÆ.

Owing to a mistake of the printer's in mixing the proof sheets, this family has been mixed with the *Xyloryctidæ* in my former paper (Tr. R.S.S.A., 1902). These families are so distinct that any real confusion can hardly arise, but the reader may prevent any such possibility by adding the family heading *Xyloryctidæ* before *Cryptophasa cucephala*, on p. 193, and *Limacodidæ* before *Thosea penthima*, on p. 206.

The following is a tabulation of the Australian genera:—

A. Hindwings with 8 approximated closely to basal half of cell ... ... *Doratifera*, Westw.
AA. Hindwings with 8 not closely approximated to cell as far as middle
  B. Forewings with 10 absent ... ... *Apodecta*, Turn.
  BB. Forewings with 10 present
    C. Forewings with 7 separate
      D. Forewings with 8, 9, 10 stalked... *Birthama*, Wlk.
      DD. Forewings with 10 separate ... *Natada*, Wlk.
    CC. Forewings with 7 stalked with 8 and 9 ... ... *Momopola*, Meyr.
      D. Forewings with 7, 8, 9, 10 stalked *Tetraphleps*, Hmps.
      DD. Forewings with 10 separate
        E. Posterior tibiæ with terminal spurs only ... ... *Parasa*, Moore.
        EE. Posterior tibiæ with two pairs of spurs
          F. Palpi moderate
            G. Antennæ of male pectinated to apex ... ... *Thosea*, Wlk.
            GG. Antennæ of male simple or serrate towards apex ... *Susica*, Wlk.
          FF. Palpi very long ... ... *Elassoptila*, Turn.

Doratifera unicolor.

Doratifera unicolora (recte unicolor), Swin., A.M.N.H. (7), ix., p. 418 (June, 1902).

Doratifera stenora, Turn., Tr.R.S.S.A., 1902, p. 189.

I think these must be synonymous, though Col. Swinhoe does not mention the pale, apical streak on forewing, and the legs in my examples are brown, not red. His name has several months' priority.

Q., Rockhampton. N.W.A., Roeburne (Swinhoe).

Birthama plagioscia.

(*Plagioscios*, obliquely shaped.)

Birthama plagioscia, Turn., Tr.R.S.S.A., 1902, p. 190.

Doratiphora aspidophora, Low., Tr.R.S.S.A., 1902, p. 218.

Birthama leucosticta, n. sp.

(*Leucostictos*, with white spots.)

Male, 22 mm. Head and palpi brown-whitish. Antennæ ochreous-whitish; in male basal two-fifths, with very long pectinations, apical three-fifths simple. Thorax and abdomen brown. Legs brown, tarsi annulated with white; posterior tibiæ with two pairs of spurs. Forewings triangular, costa straight, apex [broken], termen long, rounded, oblique; brown, with fuscous-brown irroration: a minute snow-white median discal dot: indications of a sigmoid, median, fuscous-brown line: a fuscous-brown subterminal line: cilia [worn]. Hindwings with termen rounded: greyish-brown.

Type in Coll., *Turner*.

N.Q., Thursday Island. One specimen.

Birthama dochmographa, n. sp.

(*Dochmographos*, obliquely marked.)

Female, 30 m. Head reddish-brown, mixed with whitish. Palpi brown, mixed with whitish on upper surface. Antennæ grey. Thorax brown, anteriorly reddish-brown. Abdomen fuscous-brown. Legs brown; tarsi with obscure, whitish annulations. Forewings triangular, costa straight, apex rounded, termen obliquely rounded; fuscous-brown; a triangular patch of dark fuscous and reddish-brown scales on base of dorsum: bounded externally by a fine white line from one-quarter dorsum, slightly angled in mid-disc, and continued nearly to three-quarters costa; from angle this gives off a white line along vein 5 to termen; veins 3 and 4 partly outlined with white: a dark, fuscous-reddish shade from costa, near apex, to vein 5; cilia fuscous. Hindwings with termen rounded: fuscous: cilia fuscous.

Type in Coll., *Turner*.

N.Q., Mulgrave River, near Cairns. One specimen.

NATADA MONOMORPHA, n. sp.
(*Monomorphos*, uniform.)

Female, 40 mm. Head, palpi, thorax, and abdomen pale ochreous. Antennæ whitish-ochreous. Legs brown, tarsi annulated with whitish, coxæ and femora pale ochreous. Forewings triangular, costa gently arched, apex rounded, termen rounded, scarcely oblique; uniform pale ochreous; a slightly darker median discal dot; cilia pale ochreous with a brown median line. Hindwings with termen rounded; brownish, towards costa passing into pale ochreous; cilia pale ochreous, with a brownish line towards tornus.

Type in Coll., *Turner*.

N.Q., Townsville; in February. One specimen bred by Mr. F. P. Dodd, who describes the larva as yellow, oval, with four rows of tufts of bristles.

PARASA LOXOLEUCA, n. sp.
(*Loxoleucos*, obliquely white.)

Female. 36 mm. Head, palpi, thorax, and abdomen brownish. Antennæ whitish-ochreous. Legs brownish-ochreous. Forewings rather elongate-triangular, costa gently arched, apex rounded, termen obliquely rounded; fuscous-brown; a broad, oblique, white fascia from beyond middle of costa to before middle of dorsum, its margins irregularly dentate; a dark fuscous suffusion in mid-disc follows this; a white terminal band, sharply dentate anteriorly along veins, and containing a wavy, fuscous, subterminal line; cilia [worn]. Hindwings with termen rounded; pale brownish-fuscous; cilia concolorous.

The type in Coll., *Turner*, is in poor condition.

N.Q., Townsville; in January. One specimen received from Mr. F. P. Dodd.

PARASA LOXOGRAMMA.

Parasa lozogramma, rect. *loxogramma*, Turn., Tr.R.S.S.A., 1902, p. 193.

PARASA BRACHYOPA.

Doratiphora brachyopa, Low., P.L.S.N.S.W., 1897, p. 10.

THOSEA LIOSARCA.

Doratiphora ? liosarca, Low., Tr.R.S.S.A., 1902, p. 217.

The female antennæ are not pectinated.

N.Q., Thursday Island.

THOSEA BOMBYCOIDES.

Lethocephala bombycoides, Feld., Reise Nov., pl. lxxxiii., f. 14.

Thosea erecta, Swin., A.M.N.H. (7), ix., p. 418 (June, 1902).

Doratiphora amphibrota, Low., Tr.R.S.S.A., 1902, p. 216.

I have received a female example from Col. Swinhoe, which I believe corresponds to Felder's figure and Lower's description.

SUSICA ALPHAEA.

Bombyx alphaea, Fab., Syst. Ent. iii., part i., p. 445.
Eloasa calida, Wlk., Brit. Mus. Cat. xxxii., p. 494.
Lethocephala eremospila, Low., Tr.R.S.S.A., 1902, p. 219, Q., Brisbane.

SUSICA MILTOCOSMA.

Susica miltocosma, Turn., Tr.R.S.S.A., 1902, p. 191.
Momopola cosmocalla, Low., Tr.R.S.S.A., 1902, p. 220.

Family, ZYGAENIDÆ.

Genus, HOMOPHYLOTIS, nov.

(*Homophulos*, of the same stock.)

Face smooth, rounded, somewhat projecting. Palpi moderate, slender, porrect. Antennæ in male with very long pectinations, apical sixth simple; in female thickened except near base and apex. Posterior tibiæ without middle spurs. Forewings with all veins present; 2 from near angle, 7 and 8 stalked. Hindwings with all veins present; 3 and 4 stalked, 6 and 7 separate, 8 connected by a bar with cell about middle.

No doubt a development of Procris, from which it differs in the stalking of 7 and 8 of forewings.

HOMOPHYLOTIS THYRIDOTA, n. sp.

(*Thyridotos*, having a window, in allusion to hindwings.)

Male, female, 12-14 mm. Head and thorax dark fuscous, with a dull purple sheen; face pale fuscous. Palpi whitish-ochreous. Antennæ dark fuscous with a white subapical ring; pectinations in male very long, outer row twice as long as inner. Abdomen dark fuscous. Legs whitish-ochreous; tibiæ and tarsi barred above with fuscous. Forewings elongate-triangular, costa at first straight, rather strongly arched towards apex, apex rounded, termen straight, oblique; dark fuscous, with a dull purple sheen; cilia whitish, bases dark fuscous. Hindwings with termen nearly straight; dark fuscous; an oval central translucent area, almost devoid of scales except on veins; cilia as forewings.

Type in Coll., *Turner*.

N.Q., Kuranda; in February and March. Four specimens received from Mr. F. P. Dodd.

Family, TINEIDÆ.
Sub-Family, XYLORYCTINÆ.

CRYPTOPHASA ALPHITODES, n. sp.

(*Alphitodes*, floury.)

Male, 35 mm.; female, 47 mm. Head and palpi whitish. Antennæ whitish; pectinations in male moderate (5). Thorax whitish, irrorated with grey. Abdomen whitish-ochreous. Legs fuscous, irrorated with whitish-ochreous; posterior pair mostly whitish-ochreous. Forewings elongate-oblong, costa gently arched, more strongly in female: vein 2 from two-thirds; whitish, irrorated with grey; an oblique fuscous bar from base of costa to fold; an oblique oval median discal spot outlined with fuscous scales, centre whitish-ochreous; a few fuscous scales in disc at one-third before this; cilia whitish, on costa barred with fuscous. Hindwings whitish-ochreous: cilia whitish.

Type in Coll., *Turner*.

N.Q., Thursday Island. Two specimens.

CRYPTOPHASA THEMERODES, n. sp.

(*Themerodes*, grave, sombre.)

Female, 35 mm. Head fuscous, mixed with whitish; face white. Palpi whitish. Antennæ fuscous. Thorax fuscous, mixed with whitish. Abdomen grey, apices of segments whitish, preceded by ferruginous. Legs whitish, with fuscous irroration. Forewings elongate-triangular, costa rather strongly arched in female: vein 2 from three-quarters; whitish, intimately mixed with grey, and with some dark fuscous scales: discal dots scantily represented by dark fuscous scales, first at one-third, second beyond middle, third on fold obliquely beyond first: several dark fuscous dots near termen: cilia grey. Hindwings whitish, towards termen suffused with pale fuscous; cilia whitish, with a fuscous line near bases.

Type in Coll., *Turner*.

Q., Stradbroke Island: in November. One specimen.

XYLORYCTA CIRRHODES, n. sp.

(*Cirrhodes*, yellowish, tawny.)

Female, 32 mm. Head brownish-ochreous: face paler. Palpi ochreous-whitish, mixed with fuscous. Antennæ pale fuscous. Thorax brown. Abdomen pale ochreous: with five transverse ferruginous bars. Legs ochreous: anterior and middle pairs somewhat infuscated. Forewings elongate-oblong, costa rather strongly arched in female: whitish-ochreous irrorated with grey: three brownish-ochreous median blotches, first at base, second before, and third after middle: a well-

marked, whitish-ochreous line from two-thirds costa obliquely outwards, bent in disc, forming a rounded elbow, and ending in three-quarters dorsum; terminal part of disc suffused with brownish-ochreous; cilia pale ochreous. Hindwings and cilia ochreous.

Type in Coll., *Turner*.

Q., Goodna, near Brisbane; in October. One specimen.

LICHENAULA CALLISPORA, n. sp.
(*Callisporos*, prettily spotted.)

Male, female, 12-20 mm. Head white. Palpi white; second joint with a basal, third joint with a basal and apical blackish ring. Antennæ blackish: in female white, annulated with blackish; ciliations in male short ($\frac{2}{3}$). Thorax white, with variable blackish spots. Abdomen whitish. Legs whitish; anterior and middle pairs annulated with blackish. Forewings narrow-elongate, costa nearly straight; white, with blackish spots; a row of two or three spots close to base; two to four spots on costa; a variable number of spots in disc and on dorsum; these may be partly confluent with each other and with costal spots; a terminal series of spots; cilia white, with a blackish bar at apex. Hindwings with termen rounded; whitish grey; cilia whitish.

Type in Coll., *Turner*.

V., Birchip. Three specimens, received from Mr. D. Goudie.

PROCOMETIS APLEGIOPA, n. sp.
(*Aplegios*, plain, simple.)

Male, female, 15-19 mm. Head ochreous. Palpi with terminal joint two-thirds second: pale fuscous, internal surface whitish. Antennæ fuscous. Thorax pale ochreous, with a large, central, fuscous suffusion. Abdomen ochreous-whitish or grey. Legs pale fuscous: posterior pair, except tarsi, ochreous-whitish. Forewings elongate, costa gently arched, apex acute, termen very oblique: pale ochreous, sometimes suffused with fuscous, especially towards dorsum: cilia concolorous. Hindwings with termen sigmoid: grey: cilia grey.

Type in Coll., *Turner*.

Q., Stradbroke Island: in January. Three specimens.

Family, HEPIALIDÆ.

Genus, FRAUS.

Fraüs, Wlk., Brit. Mus. Cat. vii., p. 1564.

Hectomanes, Meyr., P.L.S.N.S.W., 1889, p. 1125.

Without denying the probability of Mr. Meyrick's explanation of the origin of this name, I think it is best to treat it as one of Walker's nonsense-names.

Fraus crocea.

Hectomanes crocea, Luc., P.L.S.N.S.W., 1891, p. 283.

The female has the forewings proportionately narrower than in the male, and of a pale brownish colour, the hind-wings being grey-whitish. Dr. Lucas has described a variety of the male as female.

Q., Brisbane, Toowoomba: in March, April, and May. N.S.W., Sydney.

Fraus simulans.

Fraüs simulans, Wlk., Brit. Mus. Cat. vii., p. 1564.

Hectomanes simulans, Meyr., P.L.S.N.S.W., 1889, p. 1126. Male, nec., female.

Hectomanes fusca, Luc., P.L.S.N.S.W., 1891, p. 283.

Female specimens received from Mr. G. Lyell have the forewings uniformly fuscous without any trace of a white streak.

I have not seen Dr. Lucas's type, but do not think it is likely to be distinct.

V., Moe, Gisborne. T., Hobart.

Fraus bilineata.

Fraüs bilineata, Wlk., Brit. Mus. Cat. xxxii., p. 595.

I think Mr. Meyrick has been mistaken in describing this as the female of the preceding species I have male examples with markings exactly similar to the female.

V., Melbourne. W.A., Coolgardie.

Hepialus splendens.

Charagia splendens, Scott, Tr.E.S.N.S.W., ii., p. 31.

Q., Brisbane. N.S.W., Sydney.

Hepialus scotti.

Charagia scotti, Scott, Tr.E.S.N.S.W., ii., p. 34.

Hepialus daphnandræ, Luc., P.L.S.N.S.W., 1891, p. 284.

N.Q. (Dodd). Q., Nambour, Brisbane, Mount Tambourine. N.S.W., Richmond River.

Hepialus ramsayi.

Charagia ramsayi, Scott, Tr.E.S.N.S.W., ii., p. 32.

Q., Nambour, Brisbane, Mount Tambourine. N.S.W., Newcastle.

Hepialus eximius.

Charagia eximia, Scott, Tr.E.S.N.S.W., ii., p. 35.

Q., Nambour, Mount Tambourine. N.S.W., Newcastle.

HEPIALUS MIRABILIS.

Charagia mirabilis, Roths.

N.Q. I have received a fine pair of this truly magnificent species from Mr. F. P. Dodd.

HEPIALUS CYANOCHLORUS.

Hepialus thermistis, Low., Tr.R.S.S.A., 1894, p. 77 (var. female).

Hepialus cyanochlora, Low., Tr.R.S.S.A., 1894, p. 77.

The male resembles *H. eximia*, male, but has the base of abdomen and of hindwings reddish. The female is normally bright grass green, and similarly marked to *H. scotti*, female, but has the hindwings uniformly red.

Var. female *thermistis*. Differs from the typical form only in the ground colour of the forewings being brown.

N.Q., Townsville (Dodd), Mackay.

PIELUS APHENGES, n. sp.

(*Aphenges*, dark, gloomy.)

Female, 64 mm. Head, palpi, thorax, abdomen, and legs fuscous. Antennæ ochreous-fuscous. Forewings elongate-oval, costa straight, towards apex slightly arched, apex rounded, termen and dorsum continuously rounded · fuscous, with numerous whitish lunules and short streaks; cilia fuscous. Hindwings and cilia grey.

Type in Coll., *Turner*.

N.S.W., Sydney. One specimen received from Mr. G. R. Waterhouse.

TRICTENA LABYRINTHICA.

Cossus labyrinthicus, Don., Ins. N. Holl.

Q., Brisbane. N.S.W., Sydney. T., Mount Wellington. W.A., Coolgardie.

NOTE ON TERTIARY EXPOSURES IN THE HAPPY VALLEY DISTRICT, WITH DESCRIPTION OF A NEW SPECIES OF SEPTIFER.

By HERBERT BASEDOW.

[Read October 4, 1904.]

PLATES XXXV. AND XXXVI.

The district which forms the subject of the present note is situated about eight miles south of Adelaide, adjacent to the main South Road and the Happy Valley Reservoir. Mr. H. Y. L. Brown, the Government Geologist, has outlined the geological features of the district, and the late Professor Ralph Tate placed in the Geological Museum of the South Australian School of Mines a number of tertiary fossils which were obtained during the construction of the Happy Valley Reservoir. The names of these species appear in the catalogue of tertiary fossils in the Museum of the School of Mines, compiled by Mr. G. B. Pritchard, and published in the Annual Report for 1891. The bed-rock—within a valley of which the tertiary beds were deposited—consists of coarse, arenaceous, more or less decomposed, clay slates, in parts spangled with tiny flakes of mica (secondary?). The beds vary in colour through yellow, brown, blue, and chocolate, and are highly ferruginous.

TERTIARY.—*Eocene*. The deposits of this age are chiefly exposed in cuttings, and vary from a compact, greenish, chalcedonised sandstone, with fossils wholly converted into chalcedony, through a more friable, decomposed, white, "chalky" matrix (also fossiliferous), to a glauconitic, iron-shot sandstone, with casts and impressions of shells preserved in glauconite and limonite. A complete pseudomorphous replacement of the molecules of the original calcium-carbonate by chalcedony, glauconite, and limonite is thus exemplified in one and the same bed. The most inland exposure known in this district was passed through during the excavation of the contour-channel around the Happy Valley Reservoir, which intercepts the surface drainage. Fossils found at this spot are mostly pseudomorphs in chalcedony, the specific identifications of which are in many cases quite impossible

The following are the most characteristic species observed: —

Nautilus sp. (as at Aldinga)
Voluta sp.
Fusus simulans, Tate (?)
Turritella aldingæ, Tate
Trivia sp.
Pecten eyrei, Tate
P. flindersi, Tate
P. hochstetteri, Zittel
Modiola sp.
Leda sp.
Lucina sp.
Cardium moniletectum, Tate
Chione multitaeniata, Tate
C. sp.
Magellania pectoralis, Tate
Schizaster abductus, Tate
Macropneustes decipens, Tate

This chalcedonic deposit weathers to a more or less powdery, whitish mass. A similar deposit occurs in a well section and on ploughed land on a property situated about a quarter-mile from the main road in Maclaren Vale. In this locality *Turritella aldingæ* is a conspicuous form.

In an excavation on the Vale Royal Vineyards a bed of richly fossiliferous, glauconitic sandstone was passed through, and it is capped by a hard band of ironstone cement. The height of the tertiary beds at the Vale Royal Cellars is, roughly, 450 feet above low-water mark at the present day. South of Aldinga the beds, which are unmistakably identical and continuous with the Happy Valley exposures, are at water-level. The question arises whether this difference in altitude can be attributed to the gradual upheaval of the beds, or to a fault : but the former assumption appears the more likely. The fossils which I gathered at this excavation are in a better condition than in either of the former instances, and appear principally as pseudomorphs in glauconite and limonite. The species are: —

Turritella aldingæ, Tate
Calyptraea placuna, Tate
Lima bassii, T. Wds.
Limatula jeffreysiana, Tate
Pecten eyrei, Tate
P. sp.
P. flindersi, Tate
Septifer subfenestratus, sp. nov.
Cardita latissima, Tate
Cardium victoriæ, Tate
Chione cainozoica, T. Wds.
Protocardium hemimeris, Tate
Tellina, sp.
Myadora, sp.
Humphreyia teredina, Tate
Magellania pectoralis, Tate
M. insolita, Tate
M. tateana, Tate
Magasella, sp.
Dentalium subfissura, Tate
Amphihelia striata, T. Wds.

Miocene.—Under this heading I have classed an extensive sandstone formation, which, to all appearances, conformably overlies the true Eocene. Its physical features are

recognisable — even where denudation has covered it with soil and sand—by level, disconnected tracts of land ending abruptly on one or more sides in a scarped face and a talus slope abutting against the base. Characteristic vegetation growing on the surface of the formation is *Banksia* and *Casuarina*. The sandstone, composed essentially of rounded to subangular grains and pebbles of quartz, varying in size from submicroscopic dimensions to one or two inches in diameter, is cemented by protoxide of iron. A local leaching out and reprecipitation of the iron oxide has produced masses consisting of uncemented sand-grains (the so-called "quicksands" of the quarrymen) in the one case; and a variegated aspect of the rock in the other. In certain parts of the country large surface deposits of loose sand have thus been produced from the sandstone. Small accessory crystals of fluorite and "pockets" of glauconite are distributed through the rock. The formation shows no definite planes of stratification, but here and there a distinct "current" or "false bedding" is visible. Fossils have so far been found only at one spot in the upper sandstone: at a point some hundred yards west of the reservoir, in the exit channel of the by-wash; but they are too imperfect for specific or even generic determination. In the upper zone of the sandstone, however, occur hard, siliceous, cylindrical masses, having the appearance of fossilised roots and stems of plants. If such, an exact determination might have thrown some light upon the somewhat doubtful age of the sandstone. Professor H. Graf zu Solms-Laubach kindly undertook the determination of the "roots" for me. After preparing the necessary micro-sections, the Professor came to the following conclusion, which I give in his own words:—"Die cylindrischen Exemplare scheinen aus verschiedenen zusammengebackenen Wurzeln oder Stengeln nach Art von Japorta's *Schizocaulon* zu bestehen. Da sie indessen gar keine Strustur bieten, so kann ich leider nicht einmal sicher sagen ob sie pflanzlichen Ursprungs sind. Für die Bestimmung der Formation aus der sie stammen geben allerdings diese Fossilreste gar keinen Anhalt." In a subsequent note he continues:— . . . "wenn es aber dergleichen (*Schizocaulon*) sein sollte, so kann es immerhin ebensogut aus miocenen oder eocenen Ablagerungen stammen."

From these statements it is clear that no definite results can be drawn from the examination of the "roots." In the first place, it is still doubtful whether they are of vegetable origin; secondly, the generic identification is uncertain; and lastly, if the identification be correct, there remains the choice between Eocene and Miocene for the age of the formation, as *Schizocaulon* may occur in either epoch.

The presence of large quantities of glauconite is of interest. Appearing, as it does, as "pockets" of over a foot in thickness, it would, at first sight, suggest a contemporaneous deposition with the sandstone. Deposits of glauconite are at the present day usually found at depths of from 700 to 800 fathoms.* The fact, moreover, that the fossil casts of shells are pseudomorphs in glauconite further indicates a transportation and infiltratory redistribution of the mineral, probably in a state of suspension in percolating water as an exceedingly fine powder, capable of passing with the water through the smallest cracks and crevices of the rock.

The occurrence of subangular, or even angular, pebbles in the sandstone has been alluded to. This fact, taken in conjunction with the abundant drift bedding and signs of contemporaneous erosion, strongly suggests action by an irregular agent. The entire absence (or practically so) of fossils in the upper portions of the sandstone, a formation which appears conformable with the true Eocene below, points to a marked change in the sequence of events which produced a change in the sedimentary deposits.

Recent.—Alluvium, sand, and black soil occupy the greater portion of the low-lying areas and depressions. The varying character of the fertile loams filling the valleys has suggested a lacustrine origin.† On the calcareous soils a deposit of nodular and earthy travertine occurs, which has been produced by lateral secretion from the metamorphic limestones on the west.

SEPTIFER SUBFENESTRATUS, sp. nov.

Shell inequilateral triangular, fairly convex; umbo strongly curved and marginal; dorsal line flat-convex; ventral margin straight or slightly inwardly indented. Ornamented with stout, longitudinal, angulated ribs, sometimes appearing bifurcated without being confluent, straight in centre, curved dorsally, the median ribs the thickest; also with finer concentric lines, occupying the interspaces and not traversing the ribs: few conspicuous folds of growth.

* Murray: Rep. Challenger Expedition and Proc. Roy. Soc. (London), vol. xxiv.

† Since the completion of the Happy Valley Reservoir a slight leakage of water southwards has been the means of destroying the vegetation along the course of its flow. The crystallisation of salt at the surface along this course is noteworthy.

Interior unknown.

Dimensions.—Length, 4.4; breadth, 2 mm.

Locality.—Vale Royal Vineyards, Happy Valley.

Horizon.—Eocene: Glauconitic sandstone.

Remarks.—The description has been made from a pseudomorphous cast in glauconite.

The species comes near to *S. fenestratus*, Tate; but differs from it by being a more stumpy shell, less acute anteriorly, and having a more rotund marginal outline posteriorly. The angle between the margin of the post-dorsal area and the dorsal line is less defined, and the ventral margin less curved. The ribs are stronger and fewer in number.

I have had opportunity of showing the specimen to the late Professor Tate and Mr. J. Dennant, who agreed with me in its specific variation.

THE GEOLOGY OF THE MOUNT LOFTY RANGES.
PART I.—THE COASTAL DISTRICT.

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[Read September 6, 1904.]

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I. INTRODUCTION.

The geological age and successional order of the rocks of the Mount Lofty Ranges have given rise to much discussion. The earliest observers, such as Jukes, Burr, Selwyn, and others, were content to use some general terms for their designation, such as "primitive schists," "primary," or "lower palæozoic," without risking any definite determination.

Mr. A. R. C. Selwyn (at that time Government Geologist of Victoria) in 1859 made an eight weeks' geological tour of the country, extending from Cape Jervis to Mount Serle. In his official report to the South Australian Government, Selwyn refers the palæozoic rocks met with in his journey to three divisions, which he named respectively *(a)* first stage: *(b)* second stage: and *(c)* third stage. These he regarded as probably distinct and unconformable, and with some hesitation classed them as Cambrian and Silurian, or possibly going as high in the series as Devonian.

Taking these three series in descending order, Selwyn defines their occurrence as follows:—

"*First.*—Those beds which occupy, in great anticlinal and synclinal undulations, the whole of the country north to Mount Serle, from a line drawn from the head of the Willochra north-easterly to the head of the Siccus River, consisting of:—1. The upper quartzose sandstone and quartz rock series; which, commencing with the summit of Mount Remarkable, extends through all the peculiar flat-topped and tent-shaped hills west of Port Augusta, and forms generally

the summits of all the higher peaks and ranges, as far north as Mount Serle, including the singular and picturesque Pound Ranges at Wilpena and Warraweena. 2. The hard, fine-grained, and micaceous green, grey, and purple slate, sandstone, and flag series. 3. The siliceo-calcareous series, or the Angorigina, Appealina, and Oratunga limestones. The dark blue, fine-grained arenaceous flags and sandstones of Appealina.

"*Second.*—The beds that occupy the whole of the country south from the above-mentioned line to Cape Jervis, consisting chiefly of slates, shales, and sandstones of various textures and colours with intercalated bands of gneissose, euritic, and micaceous schists, bands of quartz rock, and crystalline limestone, associated in certain localities, from the Gawler River south to Cape Jervis and Port Elliot, with eruptive granitic and hornblendic rocks.

"*Third.*—A series of beds, certainly the lowest in geological position in the whole of the central chain, but occupying a comparatively small area, chiefly confined to the watershed of the Onkaparinga. On these the only profitable goldfield hitherto discovered in South Australia is situated, and it is, I think, along the axis of these lower beds only that any important extension of the already known auriferous area can be expected." *

Selwyn was in error by referring his three main divisions to different geological ages, and as being unconformable with each other; and, at times, errs in fixing the geological horizon of the beds that he describes, but the order of succession laid down by this experienced field geologist is the correct one. He clearly shows that the purple slates, with their associated quartzites and calcareous beds, occupy the highest position in the series, and that the beds have a descending order as they outcrop to the eastward. With great discernment he forecasts the possibility of an error in his conclusions, and says:—"It is just possible that no such natural divisions exist in the rocks of the South Australian chain as are here sketched out, and that the difference in general mineral and lithological characters, observed between the northern and southern rocks, is entirely due to the metamorphic influence of the granitic axis that, at Cape Jervis, extends in a north-easterly direction, showing itself at intervals on the surface to Angaston, and then seems to break through the chain and continue its course to the north-east, passing under the great tertiary flats of the Murray basin: and, in all probability, again re-appearing in the Barrier or Stanley Ranges." †

* "Geological Notes," by A. R. C. Selwyn. Parl. Paper (No. 20), 1860, p. 14.

† Op. cit., p. 14.

Thirteen years later (1872) George H. F. Ulrich, late Senior Field Geologist to the Geological Survey of Victoria, reported to the South Australian Government on "the mineral resources of the country lying within 250 miles north of Port Augusta."* This author does not discuss the geology of the Mount Lofty Ranges in detail, but he corrects Selwyn's observations in one particular. He states:—"I agree with Mr. Selwyn, for the same reasons he advanced, in unhesitatingly assigning them (the rocks) to one of the older epochs of the palæozoic period—the Lower Silurian being perhaps the most likely one. Owing, probably, to my rapid mode of travelling, I was not able, however, to recognise the features upon which Mr. Selwyn based their subdivision into older and newer; for throughout the country traversed, from the Burra northward, I saw no evidence of any unconformity in the strata (the unconformable limestone patch noticed at the Sliding Rock Mine being, no doubt, much more recent); they seemed to me to represent one and the same grand series, only in places more or less metamorphosed by contact with intrusive rocks, as at Yudanamutana, near Mount Emily, Mount Plantagenet, and, perhaps, in a number of other localities.

Little further attention was given to the geological characteristics of the fundamental rocks of South Australia until the late Professor Ralph Tate entered upon his duties as Professor of Natural Science in the Adelaide University in 1876. In the following year Tate delivered a series of ten lectures under the auspices of the University on "The Ancient Physical Geography and Geology of South Australia." In the succeeding year (1878) he placed his views on permanent record by a fuller exposition of his conclusions on the geological outlines of the colony in a Presidential address,† delivered before the Philosophical Society of Adelaide. In his scheme Tate divided the older rocks into two main divisions, viz.:—(*a*) Pre-Silurian, and (*b*) Lower Silurian. He was led to these determinations mainly by the discovery made, shortly before, by Mr. J. G. O. Tepper, of a fossiliferous limestone of palæozoic age at Ardrossan, Y.P. Tenison Woods‡ had previously advocated the Silurian age of the Mount Lofty Ranges, in reply to whom Tate said:—§ "Recent discoveries, which have been communicated to this Society by Mr. Tepper, necessitate their relegation to a much more ancient

* "Mineral Resources North of Port Augusta." Parl. Paper, (No. 65), 1872, p. 15.

† Trans. and Proc. of Phil. Soc. of Adelaide, vol. ii., 1878-9, p. xxxix.

‡ "Geological Observations in South Australia," pp. 20, 21.

§ Pres. Ad. Op. cit., p. xlv.

epoch. The chief facts are that in the neighbourhood of Ardrossan a lower series of metamorphic slates and limestones is covered unconformably by fossiliferous limestones of the Lower Silurian epoch; and, though the lower series, underlying the fossiliferous limestones and associated strata about Ardrossan, cannot be brought into direct relationship with the fundamental rocks on this side of St. Vincent Gulf, yet their mineral character and sequence place them in accord; and the same may be said of the rocks constituting the high lands on Eyre's Peninsula." In this quotation Tate co-ordinates the Mount Lofty beds with the basal beds at Ardrossan, which at the time he classed as pre-Silurian, and later as Archæan; the grounds of their assumed identity being based chiefly on their supposed lithological resemblance.

Tate also differed from Burr, Selwyn, and Ulrich in his view of the order of succession shown by the Mount Lofty beds. The earlier observers mentioned believed that the beds passed from newer to older in their eastward extension, whilst Tate interpreted them in the reverse order. In the address already quoted he says:—* "The strata composing the principal range of South Australia have a general dip to the south-east, and show a succession of clay slate, with quartzite bands, crystalline limestones, mica slate, and other decidedly metamorphic rocks, and granite. It is remarkable that the apparently less metamorphosed strata occupy the lowest position, whilst the uppermost stratum is gneiss, unless we regard the granite, which follows next, in the light of the extreme of alteration of which the gneiss is an earlier phase. That the highly metamorphic rocks do not form the axis of the Adelaide chain is beyond dispute, and in various traverses across the strike of the strata of our hills I have failed to detect faults or inversion, which would account for their exceptional position, whilst, on the contrary, the successional arrangement is sufficiently clear to leave little room for question."

The above assumption, that the Mount Lofty Ranges, throughout their entire width, represent a single monoclinal fold, would involve an enormous thickness of beds. This view is maintained by the late Professor Tate, who quotes Selwyn's estimate that the beds between Normanville and Encounter Bay are nearly 30,000 ft. in thickness, and adds, "There cannot be a doubt that the thickness of these fundamental rocks is much greater in those portions of the central chain, near Adelaide, than in the Cape Jervis promontory." He also quotes Mr. Scoular, who believed that the beds exposed in the South Para River had a thickness of

* Op. cit., p. xliii.

90,000 ft., and that "this thickness is not a moiety of the whole." *

Mr. H. Y. L. Brown, Government Geologist, in his Annual Report, 1883, published a general outline of the geology of South Australia, accompanied by a geological map and sections. A revised edition of the map was published in 1886, in which the following order of the older rocks was given:—

PALÆOZOIC—(?) *Devonian.* Tent Hill formation, west of Port Augusta.

PALÆOZOIC.—*Lower Silurian.* Clay slates, quartzites, limestones, etc., from Cape Jervis to Mount Babbage, etc.

PALÆOZOIC OR AZOIC.—Metamorphic. Mica and talcose schists, quartzites, crystalline limestones, etc.

ARCHÆAN.—Metamorphic granite. Gneiss, hornblende, and mica schists, crystalline limestones, etc.

These divisions are represented on Mr. Brown's map in three parallel bands of colour, and the descending order of the beds is indicated as occurring in their passage from west to east.

The geology of the Mount Lofty Ranges is further illustrated by Mr. Brown, in his report, by a sketch section across the ranges from Adelaide to Strathalbyn. There is, however, an apparent discordance between Mr. Brown's map and section. Whilst the former shows an order of succession in which the older beds occur on the eastern side, the section shows the lowest beds to occur on the western side. A regular south-easterly dip is shown, in the section, from the west coast to the Onkaparinga River, from which position the upper beds, in isoclinal foldings, continue to their eastern limits.

As opposed to the monoclinal theory of Professor Tate, Mr. Brown says:—"The general dip of the rocks comprising the Mount Lofty Range is to the south-east, and, as it continues eastward for a distance of some twenty miles, the thickness therefore indicated of the entire mass would be immense. The occurrence of dykes and masses of granitic rocks here, coupled with those to the north, as well as eastward and westward in other parts of the colony, indicate, I think, the probability of granite and other plutonic and igneous rocks underlying the sedimentary rocks at a certain depth underneath the whole area, either as eruptive or metamorphic masses. In this case faults and inversions of the strata must have taken place, which will account for the position of the beds and their apparent great thickness." †

* Op. cit., p. xliv.

† Ann. Rep. Govt. Geol., Parl. Paper, 1883, p. 10.

Professor Tate made a still more emphatic statement of his views on this subject in his inaugural address before the Australasian Association for the Advancement of Science, held in Adelaide in 1893. In dealing with the "Fundamental or Archæan Rocks" of Australia, he said:—"The generalisation which has sought to sweep all the crystalline rocks of Australia into the great Silurian net has been broken down by the discovery of unconformably super-imposed Cambrian strata, and, though it by no means follows that the whole of the crystalline rock masses are of Archæan age, yet there are good reasons for the belief that those rocks which exhibit the phenomenon of regional metamorphism belong to one epoch. . . . The grandest exemplification of the Archæans is in the Mount Lofty Range of South Australia. These rocks occupy there a vast monocline, with a dip to the south-east of not less than ten miles in thickness. One noteworthy lithological feature is the more highly developed metamorphism of the upper strata, mica schists, gneiss, and granite succeeding, in an ascending series, clay slates, quartzites, and limestones. This exceptional phenomenon was recorded by Jukes in 1850: 'The prevailing south-easterly dip would put the clay slates under the gneiss, mica, and chlorite slates': and independently observed by Selwyn,* in 1860 [(?) 1859]. The non-acceptance of this view by the Government Geologist of South Australia has compelled him to reverse the order of succession, and he classes the lower series as 'Silurian (and Devonian) metamorphic in part,' and relegates the upper to 'Palæozoic or Azoic, highly metamorphic.' "†

In a new edition of the geological map of South Australia by Mr. H. Y. L. Brown, Government Geologist, published in 1899, the Mount Lofty Ranges are defined as "Cambrian and (?) Lower Silurian." Later discoveries have strengthened the positions of Selwyn, Brown, and others, who have held that the Mount Lofty Ranges, in the main, belong to a post-Archæan age, and have an inferior order of succession from west to east, rather than those views so strongly held by Professor Tate.

An important factor in the chain of evidence was obtained when, in 1897, Professor David and the writer discovered *Archæocyathinæ* remains in the limestones of Normanville, which were subsequently traced along the line of strike for a distance of twenty-five miles, to a point three miles to the

* I cannot draw the same inference from Selwyn's report on this subject that Professor Tate has done.

† Aus. Ass. Ad. Sc., vol. v., p. 45, *et. seq.*

north-east of Willunga.* This important find demonstrated a definite Cambrian horizon striking through the heart of the Mount Lofty Ranges. A suggestion from the writer, that this discovery had great significance in relation to the geological age of the Mount Lofty Ranges, and might require a reconsideration of the position, was met by Professor Tate, in the discussion which followed the reading of the paper, with strong opposition. The professor stated that "the beds in which the fossils were found probably constituted only a spur of the ranges, and did not affect the question in its bearings on the age of the Mount Lofty Ranges as a whole."

The subject had reached such an interesting stage that no other stimulus was required to pursue it further. After several years of field study, directed to this object, I have now the honour to place the results of my observations before the Society as a first contribution towards a systematic elucidation of the structure and succession of the older rocks of this State.

The existence of a bed in the series with such distinct lithological characteristics as that possessed by the older glacial till, and its remarkable persistency, have greatly simplified the work attempted; for wherever this bed occurs it supplies a datum line from which the geological section can be interpreted and the associated beds placed in their consecutive order, even in the most remote localities.

I have taken the country in the neighbourhood of Adelaide as the type district of the series, and the beds which outcrop between Mount Lofty and the sea may be regarded as the index to most, if not all, the Palæozoic rocks of the State.

II. Order of Succession.

So far as the foot hills and coastal districts near Adelaide are concerned, the Palæozoic beds appear to belong to a conformable series, and may be subdivided into well-marked divisions, as shown in the following order in superposition, viz.:—

(A) *Purple slates, quartzites, and limestones*—Marino, Hallett's Cove, Lower Onkaparinga.

(B) *Siliceous, blue, pink (oolitic), and dolomitic limestones*—Brighton, Field River, Hackham, &c.

(C) *Banded, fine-grained clay slates and shales*—Tapley's Hill, &c.

(D) *Glacial till, grits, etc., with erratics*—Sturt River, Onkaparinga River, &c.

(E) *Siliceous and felspathic quartzites and phyllites*—Mitcham, Glen Osmond, Magill, etc.

* "The Occurrence of Low. Cam. Fossils in the Mount Lofty Ranges." Trans. and Proc. Roy. Soc. S. Aus., vol. xxi., p. 74.

The present paper is limited to a description of the three upper members of the series, with special reference to their development in the Field River and Onkaparinga districts.

(A) Purple Slates.

It is convenient to adopt this heading for a great series of slates, shales, flaggy sandstones, quartzites, and limestones which are more or less distinguished by a dark purple or chocolate colour. There is apparently no stratigraphical break between the Brighton limestones and these dark-coloured beds; but the lithological distinction between the two divisions and the superposition of the purple slates are clearly defined. The fact that these beds are mostly submerged by the waters of the Gulf, in the neighbourhood of Adelaide, no doubt accounts for the fact that they have not been studied to that extent which their importance demands. In the sea cliffs between Marino and Hallett's Cove, as well as on the beach, planed down by the sea, it is easy to recognise the marked contrast which these beds present to any others on their eastern side. Dark-purple slates, sometimes chloritic, splitting up into small flakes and prismatic pieces, line the coast. The cliffs are almost on the line of strike, and expose the waste of a great anticlinal fold facing the sea. Interstratified with these dark shales will be found very hard-grained and dark-coloured quartzites, often divided up into thin beds and laminæ, and a few similarly coloured, thin limestones, hardly to be distinguished from the associated argillaceous beds, and often indicated by containing white veins of fibrous calcite.

At Marino these beds have a breadth of barely half a mile before they pass below sea level, to re-appear on Yorke's Peninsula as the *Archæocyathinæ* limestones, underlain by purple slates, etc., as on the eastern side of the Gulf. These beds, inferior to the fossiliferous limestones, have been proved in the Maitland bore, they outcrop on the Winulta Creek, and are seen in the railway cuttings between South Hummocks and Kulpara. Characteristic exposures of these beds occur at Black Point, on the north side of Hallett's Cove, where they have been intensely glaciated: and on the lower Onkaparinga, at the Horseshoe, where they formed the old sea cliffs of Miocene age. Along the line of strike, between Field River and Curlew Point, about three miles south of Hallett's Cove, there has been a zone of extreme pressure and contortion, with overfolding of the beds. Some excellent photographs of these features, taken by Mr. J. Greenlees, accompany this paper. (See Plates xxxvii.-xlii.)

To study these beds in their vast extent and most interesting features it is necessary to see them as developed in the Flinders Ranges. On the western side of Mount Remarkable they comprise the Black Range, where they have a dip to the west. Further north, near Wilmington, they form the eastern flanks of the vast anticlinal fold of Horrocks Pass; and then, in the neighbourhood of Quorn and northwards, they spread out and form the ranges of the Northern Flinders, and in low exposures can be traced in the eroded hollows separating the cretaceous outliers along the southern and western shores of Lake Eyre. Fine examples of their rugged peaks and steep declivities flank the railway from Mern Merna to Parachilna, and include, at no great distance, the great synclinal fold of the Wilpena Pound. The Parachilna Pass to Blinman is one of the most impressive pieces of rock scenery that exists in the State. The bare hills, of great height and deep chocolate colour, exhibit scoured sides and rugged outcrops that can be followed by the eye for miles, with all the distinctness of a blackboard demonstration. In places faults of great magnitude are seen to cleave the hills in broken and contorted lines. In this latitude the purple slates series is continuous, from the railway eastwards to Frome Hill, a distance across the strike of fifty miles. The Blinman Mine is in this series, and owes its existence to a fault in the rocks in close association with an igneous dyke.

One of the most striking features of this division is the prevalence of limestones of varying thickness, up to about a hundred feet. Some of these limestones are composed almost exclusively of the remains of *Archæocyathinæ*, which must have formed thick reefs in the Cambrian sea. Several parallel outcrops of thick limestones carrying these remains were observed in a recent visit, and in some instances traced for many miles along the strike. In the neighbourhood of Wirrialpa Station a number of thinner beds of limestone occur, exhibiting remarkable colitic and other forms of structure; and in some of these limestones brachiopod remains were found in considerable numbers, running in fossiliferous bands. I can but briefly refer to these features at present, leaving for a future occasion a more detailed description of this interesting district.

The age of the purple slates division is determined as Lower Cambrian,* from its *Archæocyathinæ*, *Salterella*, *Microdiscus*, and associated forms. It was my good fortune to find at the base of the cliffs, near Marino, a sea-worn pebble of purple limestone, containing organic remains, which

* Etheridge: Trans. Roy. Soc. S. Aus., vol. xiii., 1890, p. 10. Tate: id., vol. xv., 1892, p. 183.

Mr. Etheridge, of Sydney, to whom the specimen was submitted, referred to the *Archæocyathinæ*. There can be little doubt that the specimen came from one of the local rocks, as it carries a close lithological resemblance to them. This adds a palæontological proof that these beds belong to the purple slates division: to which, on the grounds of their stratigraphical position and lithological features, they had already been referred. As the purple slates division occupies the superior position in the Mount Lofty series, it fixes the latest time limits that can be applied to those members of the series which are inferior to these beds.

(B) Brighton Limestones and Siliceo-calcareous Series.

Between the Tapley's Hill shales and the purple slates there is a belt of calcareous rocks which, from earthy and siliceous limestones, in their lower beds, pass up into strong and good limestones near their upper limits. The typical order of their occurrence is as follows:—

	Approximate thickness.
(a) Buff-coloured (dolomitic) limestone ...	8 feet
(b) Pink-coloured (oolitic) limestone	15-20 feet
(c) Blue-coloured (siliceous) limestone ...	15-20 feet
(d) Dark-coloured (very siliceous) limestone	400 feet

(a) The top bed of this division is a yellowish or buff-coloured dolomitic limestone, averaging about eight feet in thickness. It is a very persistent member of the series, and is found in precisely the same relative position, in these beds, both to the south of Brighton and in the Flinders Ranges. It has not been applied locally to any economic purpose. Its toughness under the hammer makes it unsuitable for stone-breaking. Nodules and incrustations of magnesite are often found in its vicinity.

(b) Underlying the dolomitic limestone is a thick, strong limestone, of a brownish-pink colour, commonly known as "the pink limestone." In structure it is finely oolitic, and is the purest limestone of this calcareous group, averaging 86 per cent. of calcium carbonate. It has an extensive use for road metal, along the line of its outcrop, and is one of the chief constituents used by the South Australian Portland Cement Company, at Brighton, for manufacturing an hydraulic cement of excellent quality.

(c) The blue (siliceous) limestone immediately underlies the pink-coloured limestone. The line of distinction is not

always very apparent between the two beds, as the upper part of the blue limestone is often mottled with patches of a pinkish colour. In parts, it exhibits a similar oolitic structure, as shown by the pink limestone. It contains 40 per cent. or more of silica. It is fairly uniform in composition, and is applied to the same economic uses as the overlying bed, being worked up in the manufacture of cement, and is locally known as the "blue metal limestone," from its application to road-mending. It frequently carries crystals of pyrites and amethystic-coloured cubes of fluorite. At Brighton, large globular and mammillary crusts of barite have occurred on the surface of the blue limestone, the mineral having a finely fibrous structure and silky lustre.

(d) The lowest member of the group comprises a series of dark-coloured, very siliceous limestones, of variable composition, but much more siliceous than the over-lying bed *(c)*. Indeed, the beds vary from distinctly characteristic siliceous limestones to earthy, calcareous shales. This division, as a whole, is distinguished by the possession of a faintly laminated structure, which, on weathering, becomes more strongly marked. At some horizons the siliceous limestones exhibit in vertical (weathered) sections a peculiar vermiculate structure, which, at first sight, is very suggestive of fossil remains. On splitting the stone parallel to the bedding planes it is seen that this effect is produced by the occurrence of thin, wavy films of mineral matter in irregular patches. This striking feature is very characteristic and persistent, and forms an excellent means of fixing the geological horizon when these beds are seen in outcrop.

The above calcareous division, which for convenience I have grouped under the heading of the Brighton limestone series, takes rank as one of the best-marked horizons in South Australian geology. The belt can be easily traced in outcrop from Brighton, southwards, to Reynella and Hallett's Cove. At Hackham it has been extensively quarried. It crosses the Onkaparinga about a mile above Noarlunga, and can be traced further southwards until it disappears under newer deposits, shortly before reaching Aldinga. Its northerly extension is, in the first instance, obscured by the alluvial of the Adelaide and Gawler Plains, but it re-appears at the Burra, Mount Remarkable, Orroroo, Walloway, etc. The diversity of its economic products may be seen in that it has been worked for road metal at Reynella and other places, cement at Brighton, copper at the Burra, phosphates at (?) Fairview, and flux at Orroroo. The relative thinness of the beds and their solubility have led to their denudation over vast areas where they formerly existed.

Although frequently looked for, no fossil remains have been found in these limestones except a few casts of Radiolaria. This is the more remarkable as the limestones have been, as a rule, but little altered under metamorphic action. The fossiliferous pebble found on the coast, near Brighton, referred to above, has apparently come from a limestone slightly higher in the series, and belongs to the purple slates division. Descriptions of the Radiolara observed, and fuller remarks on the Brighton section, will be found in a "Note on the Occurrence of Casts of Radiolaria in Pre-Cambrian (?) Rocks of South Australia." (Proc. Linn. Soc. N.S.W., 1896, p. 571.) The paper containing these descriptions was written under the prevailing view, held at that time, that the western flanks of the Mount Lofty Ranges were probably of Pre-Cambrian age.

(C) Tapley's Hill Clay Slates.

Tapley's Hill is on the Main South Road, about eight miles from Adelaide, and due east from Brighton. The so-called "hill" is, in reality, the escarpment of the older rocks, which, in a curve to seawards, determine the southern limits of the Adelaide Plains. From the summit of Tapley's Hill a coastal plateau stretches southwards to the Onkaparinga.

The hillside is marked by numerous quarries, and the stone won is extensively used in Adelaide for kerbing and building. It is a very fine-grained, homogeneous stone, which cleaves easily at a high angle to the bedding planes. This cleavage, associated with cubical jointing, makes it a free-working quarry stone. The bedding plane, or grain of the stone, is marked by a banded structure, which, from carrying a protoxide of iron, becomes strongly developed in weathered faces, giving it the character of a "ribbon" slate. This banded structure is a very constant and characteristic feature, and is usually sufficient to determine the horizon when these beds are met with in distant localities.

The lithologcal type of this division is remarkably uniform. It is incapable of subdivision, as it practically consists of a single bed of great thickness. Although seen in many places I have not in a single instance detected a quartzite or arenaceous band throughout its vertical extent. The beds are often sub-calcareous, and, by a process of leaching, produce a superficial travertine deposit, which fills in the crevices and cements the fragments of shale which form the outcrops. There is no well-defined limit between these clay slates and the calcareous series which immediately overlie them. The upper parts of the Tapley's Hill beds become more calcareous whilst preserving their banded structure, and pass conformably up into the siliceous limestones of the member above.

In the type district these beds can be studied to advantage in the Tapley's Hill quarries; along the spur, which connects Tapley's Hill with the coast at Marino; in the bed of the Onkaparinga, where they have been crushed into short, wavy contortions; and in other outcrops. North of Adelaide they are of frequent occurrence, intercalated with other members of the series. On the west side of Mount Remarkable they are thrown down to the face of the great Spring Creek fault; and in the Horrocks Pass, near Wilmington, they make a very imposing feature, capped towards the sea by an escarpment of limestone, which, as the next in ascending order, can be referred to the Brighton series, the whole face being probably a thousand feet in height.

In some parts of the north the beds have not developed cleavage, but split readily in laminæ parallel to the bedding, producing thin flagstones. This is the case in their occurrence on the western side of Mount Remarkable, in a position where their determination, as belonging to the Tapley's Hill horizon, is placed beyond all doubt. In places, both north and south, the beds have become much decomposed and converted into a kaolinised rock.

To further elucidate the stratigraphical features of the beds in question, two sections, in the type district, will now be described in some detail.

III. The Field River Section.

The small stream, which has received the dignified name of "river," takes its rise near the Happy Valley Reservoir. The stream crosses the Main South Road one mile north of Reynella, from which point it follows a meandering course of four and a half miles, and finds its outlet to the sea at Hallett's Cove. The line of section shown in the diagram (Plate xliii., fig. 1) is about three and a half miles in length, and in a direction a little north of east and south of west. In the upper part of the stream the section has been taken from the outcrop shown on the north bank, and in the last mile from the south bank. The general strike of the beds is north and south, with a prevailing dip to the west. The beds, however, roll considerably along the line of strike, in consequence of which there is frequently an apparent dip to the south.

As already intimated, there is no defined line of distinction between the Tapley's Hill slates and the calcareous series which immediately overlies them. The passage is indicated by a gradual increase of carbonate of lime in the stone. The bridge over the Field River, on the South Road, may be conveniently taken as the line of demarcation. On the west side of the bridge the stone is a calcareous, banded

shale, somewhat resembling the Tapley's Hill stone, but has more lime in it, and is overlain by beds of siliceous and earthy limestones, which, in weathering, show the earthy particles and layers in relief. The beds roll slightly, but have a general dip varying from 15° to 20° south-west.

Half a mile from the bridge, down stream, in Section 509, Hundred of Noarlunga, a quarry has been worked by Mr. Reynell for road metal, in a thick, siliceous limestone, with a quarry face 50 ft. in height. The stone shows markedly the vermiculate structure already referred to. When the stone is split along the planes of the wavy lines, they are seen to consist of broad, uneven films of earthy silicates, separated by siliceous limestone. The lines often run nearly parallel, in pairs, which gives a striking resemblance to organic remains seen in section.

In the adjoining section (519), a little west of the district road which crosses the river, is the most important quarry in the limestones of the Field River, and is worked by Mr. Pocock. It is clearly the same set of beds as occur in the quarries of the South Australian Portland Cement Company at Brighton. The siliceous limestones, blue limestone, pink limestone, and magnesian limestone follow each other in an ascending series in the same order in both localities, which are separated by a distance of three and a half miles in a direct line. The limestone has been thrown into a series of anticlinal and synclinal folds across the strike. Pocock's quarries have been opened near the crest of the most eastern anticline. The eastern limb of the fold, as seen in the main quarry, has a dip of 25° south-south-east, and has suffered a denudation, which exposes the underlying, earthy, and siliceous limestone on its eastern side. The ground between Reynell's and Pocock's quarries is occupied by a shallow synclinal fold, which brings in a small outlier of the limestone, seen on the district road and paddock to the east, but makes no prominent feature.

Pocock's quarry exhibits a fine face of good limestone, 40 ft. in thickness, with a dip slope towards the valley. The stone varies in colour from bluish to pink, and is oolitic in structure. A large, V-shaped mass of rubbly, magnesian limestone has latterly been encountered, replacing the good stone and greatly affecting its quality. This intrusion necessitated the opening of a new quarry about a chain length to the west of the old one. Here the stone is found to be sound, and has a dip of 48 to south-east. The west side of the hill (on which Pocock's quarry is situated) forms a dip slope of the anticline, in its western limb. Near the centre of the fold the dip is at 80°, which rapidly decreases

to 45° south-south-west, making a synclinal fold with the next hill on its western side. In this synclinal trough, what is known as the "hard bed" is seen to overlie the main limestone. It is realiy tough, rather than hard, and is a yellowish, dolomitic limestone, with calcareous and ferruginous shales. This outcrop of dolomitic stone is about a chain wide. The beds dip south-south-west at 30° on the eastern side, and at a distance of fifty yards the dip changes to south-south-east at 20°. The dolomitic beds cross the stream in Section 507, passing under hard, siliceous, purple slates, which are exposed in a thick face on the southern banks of the river and have a dip of 20° south-south-east.

In the same section (507) another thick face of the main limestone is seen on the site of an old quarry. Here the dip reverts to the south-west. From this point the beds continue to exhibit gentle anticlinal and synclinal foldings in their westward extension: with the effect that the limestone is cut out on the boundary of Sections 506-507, and the lower beds of siliceous limestones form the outcrop.

Near the western boundary of Section 506, and within a quarter of a mile of the old smelting mill, a well-marked fault occurs. The fault has a strike north-east and south-west, with a hade to the north-west. On the eastern side the beds form an anticline, and have a sharp downthrow against the fault at 65°, whilst on the west side the dip is only 10° to (?) east-north-east.

For about half a mile from the fault the valley runs more in a line with the strike of the beds, and exhibits fine examples of strike folding. In Section 574 a great anticlinal fold occurs which is one of the most striking features of the geological section. (See Plate xxxvii.) The stream makes a sudden turn at the spot, and has cut back the cliff in an almost perpendicular face of one hundred and fifty feet, in siliceous limestones. The eastern limb of the anticline has a dip of 30°, and the western about 20°. Apparently there is a sharp bend or fracture in the beds, near the axis of the anticline, where the beds pass suddenly from a higher to a lower angle of dip. In consequence of the stream turning almost at right angles at this point, it has exposed, north and south, as well as east and west, sections of the beds. The latter, or main anticline, shows the folding in the direction of the dip: whilst the north-and-south section gives an instructive example of folding along the line of strike. These are typical examples of the local disturbances of the strata and are good illustrations of the difficulty which often presents itself of distinguishing the direction of dip from strike amidst the complex folding which has taken place.

The great anticline, just described, is the first indication of approach to a very disturbed area. On the western side the rocks rapidly increase in dip to 60°, in a west-north-west to west-south-west direction. This high angle of dip once more brings into the section the main limestone, followed by the yellow dolomitic limestone, with a dip of 60°-70°. These beds are in all respects similar to the corresponding outcrops higher up the valley, and have a surface spread of thirty yards.

There immediately follow, in ascending order, purple calcareous slates, green slates, and quartzites. These beds mark the passage upwards to the purple slates division, which is the highest member of the series. There is the strongest lithological contrast in the appearance of the beds belonging to the respective divisions, and cannot fail to be noticed. Near the junction a very high cliff of purple slates occurs on the northern side of the stream, and in the face of this cliff the adit of the old Worthing Copper Mine (which failed to secure ore in payable quantities) has been driven. As is common in the purple slates, the beds are much cleaved and jointed, and readily break up into small prismatic fragments, making the determination of the bedding planes somewhat difficult, but they are here at a high angle of dip. The succeeding beds become more siliceous, and split up into numerous thin beds of quartzite and shale, which are greatly contorted by acute and inverted foldings. The alternation of beds of unequal compressibility has, no doubt, supplied favourable conditions for producing these effects. (See Plate xxxviii.) About half a mile from the coast there is a calcareous belt in the rocks which shows a wavy structure, and is succeeded by more purple slates, calcareous grits, greenish to purple slates, and quartzites to the mouth of the river, where the cliffs consist of thin bedded, dark-coloured quartzites and shales, with a dip of 85° to the west. The cliffs are capped by glacial drift and a superficial covering of Miocene sands and clays.

At Black Point, the north headland of the bay, a very striking anticline occurs in the purple slates, with a sharp downthrow to the west. The top of the cliff is strongly glaciated, and within the amphitheatre, formed by the erosion of the rocks between the headlands of the bay, the glacial drift, a hundred feet in thickness, occupies an eroded basin in the purple slates. A section across the beds can be seen in a small watercourse, situated about midway between the two headlands, and at about half a mile from the sea a very acute anticlinal fold in quartzite can be seen forming a small waterfall.

A little south of the Field River there is an extensive floor of marine denudation produced by planing off the purple slates, which exhibit parallel lines of outcrop on the beach. The lines give a very clear exposure of the bedding along the strike, and, when the tide is out, a remarkable example of a strike overfold is seen in the form of a very extended letter ∽. It can be seen to best advantage from the top of the cliffs.

The most striking illustrations of the acute foldings which occur in these beds are found at Curlew Point, about three miles south of Hallett's Cove. (See Plates xxxix.-xlii.)

The purple slates pass out of sight below sea level, with a dip to the west. The waters of the gulf occupy a deep valley cut in these beds; in the first instance, possibly, by a river which had its watershed in highlands to the south of the present continent, and its outlet to the north. These southern highlands were in existence, as a watershed, during the (?) Permo-Carboniferous glaciation of the southern portions of Australia, and must have been, even at that time, of considerable elevation and extent, to produce a ground ice of such magnitude as to fill the valley of the gulf and overlap the adjoining land. The purple slates re-appear on the other side of the Gulf, where they are relatively thin, and rest on Pre-Cambrian beds. They are overlain by thick limestones at Curramulka, Ardrossan, Maitland, Clinton, Kulpara, etc., which contain characteristic fauna of Lower Cambrian age.

IV. The Onkaparinga Section.

Introduction.—The Onkaparinga River flows through a gorge which is, perhaps, the most inaccessible and roughest in the southern portions of the State. Between Noarlunga and Clarendon the sides of the valley rise abruptly from 300 to 600 feet in height. About two miles from the coast the river suddenly leaves the highlands and enters the plain, forming a picturesque loop known as the "horseshoe," within the limits of which the township of Noarlunga is built. At this point the river has reached its base level, the water being tidal on one side of the narrow neck of land and fresh on the other. From Noarlunga to the sea the river follows a tortuous course, with alluvial, estuarine, or tertiary banks, which continue to its mouth. Deep as is the gorge of the river it is evident it must have been cut since later Miocene times, as deposits of this age cap the hills on both sides of the river. It is possible that in pre-Miocene times the river had its outlet by Maclaren Vale, which is now choked with Miocene deposits. High-level gravels of the river bed can be seen at Noarlunga, near the top of the Church Hill, on its western side.

The Palæozoic rocks, which constitute the gorge, continue in outcrop along the east and south sides of the "horseshoe," until they reach the centre of the convex bend, when they abruptly give place to marine Miocene beds. The older rocks form the basal beds of the narrow neck of land in the bend, and are exposed for about a quarter of a mile along the right bank of the river, as it leaves the township to the north-west. On the north side of Noarlunga the Palæozoic rocks run for a mile or more parallel with the Adelaide road, on its eastern side, whilst the whole of the country on the western side, as far as the coast, consists of older and newer tertiary beds, most of which has been brought under cultivation. Several road cuttings give sections of these beds, and in the case of one, situated a little north of Hackham, marine fossils, of Miocene age, are found in a series of sands and fine gravels. About a quarter of a mile down the river from Noarlunga, a white, marly clay, similar to Witton Bluff, on the coast, makes a cliff twenty feet in height, and passes under water level. The bed contains crinoid stems, spines of echini, *Turritella aldingæ*, brachiopods, etc. These fossiliferous clays rest on coarse, sandy beds, which show a dip of 25° west; but, as the latter abut against a nearly vertical face of the older rocks which formed coastal cliffs of the tertiary sea, it is probable that the apparent dip of the beds arises from the deposits having been laid down on a shelving beach. The tertiary beds, on the south side of the river, are bounded by the Palæozoic outcrops, which gradually trend towards the coast.

The beds exposed in the gorge of the Onkaparinga correspond with those already described as occurring in the valley of the Field River, but the former have been subjected to much greater disturbance by faulting. The less cover on the highlands bordering the Onkaparinga, and the deep tributary gorges of the valley, permit a more complete study of the plan of the beds than is possible in the Field River and Brighton districts.

Purple Slates.—In consequence of the westerly trend of the coast the outcrop of purple slates, which at Marino, near Brighton, is only half a mile wide, increases to a mile on the Field River; and on the Onkaparinga, when measured in a direct line from the coast to the eastern limits of the faulted sections, is nearly four miles wide.

On the north side of Noarlunga these slates cross the main road and are exposed at the base of the cliffs, on the right bank of the river, for a quarter of a mile, capped by tertiary beds and old river gravels. On their western limits the purple slates end abruptly in a steep cliff facing the west,

having a dip of 60°, whilst the tertiary beds rest unconformably against the face of the older slates. The latter exhibit a series of anticlinal and synclinal folds, reaching a maximum dip of 65°. Near their western extremity a synclinal fold occurs, in the centre of which the beds are much broken and confused.

The hill on which the Noarlunga Church stands, together with the eastern side of the "horseshoe," and for more than a mile up the river, the purple slates show a great development, forming hills several hundreds of feet in height. In the cliff face under the church the beds dip south-south-west at 15°, and for a mile up stream they exhibit an undulating dip, which, for the most part, is at a comparatively low angle.

In Section 63, near the mouth of a small tributary on the south side of the river, the beds increase in dip, with a roll from south-west to south-east and south-south-east, at 40°. Following up this gully an instructive section is obtained. The dip changes to west at 60°, and the beds develop marked cleavage, which has a north-and-south strike, with an easterly dip at 48°. The appearance of this outcrop from across the valley is misleading, as the chief weathering is shown on the cleavage planes, giving a wrong impression as to the lie of the beds. Higher up, the dip passes rapidly to west-north-west at 73°, and at the junction of an eastern branch of the creek the dip is temporarily changed to south-east at 20°, but in a few yards reverts to the west. Following the eastern branch, in a short distance the beds become vertical, changing again to east-south-east at 73°, as they abut against the great strike fault (C) (see map, Plate xliv.) which runs in a north-east and south-west direction, and crosses the Onkaparinga, near the Ford, between Sections 48 and 56.

The main body of the purple slates on the Onkaparinga is circumscribed by two great faults. On the north the beds are cut off by an important dip fault, running east and west, through the northern parts of Sections 46, 47, 48; and by a strike fault, having a direction north-east and south-west, crossing the river at the Ford. In addition to this main outcrop there are other important areas occupied by these beds which will be referred to when dealing with the faulting that has taken place on the eastern side of the field.

Lithologically, the purple slates of the Onkaparinga district very closely resemble those which occur in the Field River, Hallett's Cove, and Marino outcrops. The stone is extensively jointed and cleaved, has a characteristic banded appearance, caused by alternating darker and lighter bands

of a purple colour, and is frequently ripple-marked. Occasionally quartzites are developed, but they do not attain any considerable thickness.

The limestone, corresponding to that worked at Brighton and the Field River, is greatly disturbed and faulted in this district. In composition and structure it is identical with the outcrops further north, but the severe mechanical strain it has been subjected to is shown by the limestone being often ramified in all directions with veins of calcite and other minerals, which have filled and healed the rents produced by the crushing of the stone.

About three-quarters of a mile south from Hackham the limestone is seen on the east side of the road, in Section 40, forming a round hill, which has been extensively quarried. The stone exposed in the quarry is about thirty feet in height and is a dark blue limestone, thickly studded with calcite, which is frequently mixed with fluorite and pyrite. It is extensively used for road metal, but the readiness with which the calcite breaks down on the rhombohedral cleavage makes it less serviceable for this purpose than the more uniform stone of Field River. On the rise of the hill, above the quarry, the stone passes up into pink-coloured limestone and yellow dolomitic varieties, characteristic of these beds in other localities. The dip is east-south-east, at a low angle, the quarry being situated near the axis of an anticlinal fold, the western limb of which has been denuded. In a small creek on the south side of the hill an old quarry, worked on the same line of stone, gives an exposure of both limbs of the anticline. The limestone has an outcrop of only about half a mile in length, being cut off at both extremities by faults; a strike fault (A) runs nearly parallel with the limestone, on its eastern side, and cuts it off just north of the Hackham quarry, and a dip fault (B) cuts it off near the district road on the south.

The limestone and associated beds have a south-west trend, skirting the agricultural ground which occupies the bottom of the valley. From the main quarry they can be traced across the first creek, in which the anticlinal fold, referred to above, is seen: they then follow the base of the next rise and are well exposed in the next creek (Section 39), as strong beds of blue limestone, forming a small waterfall. Dip, east-south-east, at 34°. From this point, and through Section 47, the outcrop has to be followed chiefly by a thick crust of travertine, which ends on the district road running north and south, at a point about 200 yards south of the main road. Here the limestone beds are cut off to the south by the dip fault, already referred to, and purple slates

take their place. About 200 yards higher up the hill than where the limestone beds reach the district road there is an outcrop of tertiary beds which follow the crest of the hill, nearly to the banks of the Onkaparinga, and are more or less covered with a travertine crust, which must not be confounded with the travertine of the older formations. The corresponding hill, on the opposite side of the main road, is also composed of tertiary calcareous sandstones and travertine.

From the trend of the limestone from Hackham, the line of strike should intersect the Onkaparinga near Noarlunga; but these beds are not met with in the river section until a point is reached one and a half miles above the township. There is, therefore, a lateral displacement of the beds to this extent by the great dip fault.

The beds re-appear on the ridge road (which runs along the north side of the Onkaparinga), at the junction of a steep district road that follows down a gully and crosses the river at the Ford, between Sections 48 and 56. Here the two most important faults (B and C) of the district intersect. The limestone, which has been thrown a mile and a half east by the dip fault, is obliquely cut by another strike fault, running north-east and south-west. The paddock on the east side of the gully road is strongly ridged with limestone outcrops. The fault, with the limestone on its eastern side, crosses the gully road diagonally about half-way down to the river; and at a lower level the junction of the limestone, faulted against the purple slates, can be well studied, near the river level, on the western side of the road. The limestone shows discordant dips across its strike; but the general dip is towards the fault, viz., south-west at 40°; whilst the purple slates, which are greatly decomposed at and near the fault area, have a dip varying from 85° to 90° E. The limestone first dips to the fault, as stated, then east, 20° south, at 30° passing into a synclinal fold, which gives a reading of 70° west; whilst the underlying earthy beds, which rise on the eastern side, have a dip of 80° west. The limestone at the bottom of the valley has a spread of eighty yards.

The limestone crosses the Onkaparinga just east of the Ford, and skirts the southern rises of the river, on its left bank, going south. In the first gully below the Ford (Section 56) massive limestone outcrops make a prominent feature, and an excellent transverse section of the fault area is seen. (See Plate xliii., fig. 4.) The limestone is here exposed on both sides of the fault. On the west, or downthrow side, it forms a segment of an anticlinal curve, with a thick covering of purple slates, which fold over into the

Onkaparinga at 80°. On the east side of the fault the limestone dips east-south-east at 80°, being overlain by the siliceous limestones which dip in the same direction at 70°. The fault is, therefore, the result of an overthrust from the east, which has fractured the beds, and given a reversed position to the limestone, and placed the lower beds in a superior position.

The limestone has a strong outcrop as it passes over the hill into the next gully, to the south-west, where it has a dip west, 20° north, at 80°, and is cut out at the intersection of dip fault (D) with the main strike fault (C).

Still travelling south-west, two dip faults (the one just mentioned (D); and another (E), about 250 yards distant), run from the strike fault (C) in an easterly direction. The result is a downthrow, by which a wedge-shaped strip of purple slates is introduced, and cuts off the limestone beds both on the northern and southern sides of the strip.

Further strike faults are developed from each of the two dip faults just referred to. On the east side of the district road (which crosses the river at the Ford), and near the top of the hill on the southern side of the river, a strike fault (F) can be seen in a small gully which connects with Long Gully. This fault crosses the latter obliquely, and follows a line nearly parallel with the Onkaparinga. On the west side of the fault there are two small pockets of limestone, as outliers, preserved by a downthrow to the fault, one on either side of the valley. The southerly patch dips south, at 23°, with a roll to the south-east. The east side of the fault is occupied by purple slates which dip west, 10° north, at 38°. The fault plane is very strongly marked as it crosses another tributary, on the east side of the valley, near the mouth of Long Gully, with purple slates on one side, and the impure siliceous limestones on the other.

Parallel with the fault just described is another strike fault (G), about a quarter of a mile further to the east, which brings in the limestone once more at an angle of the creek. To the south the limestone is cut off by the dip fault (D), and, together with two repetitions of the same bed, is cut off on the north side by dip fault (I). Where the limestone crosses Long Gully the beds are vertical, whilst the purple slates, on the west side, dip west at 70°. The junction of the limestone with the purple slates, along the fault plane, is marked by a powerful spring which issues from the limestone in Long Gully, and yields a constant supply of running water in the creek, which is not affected by the seasons. This is an excellent illustration of a fault spring, the subterranean water in the calcareous beds on

the east side being thrown out to surface by the bar of purple slates on the western side.

A little further to the north, in Section 58, the limestone strikes diagonally between faults (F) and (G), and is cut off by each; and at the same time is intersected by a dip fault (H), which causes a lateral displacement of the bed.

The southern portions of this very disturbed field are determined, in their northern limits, by the important dip fault (E), which, with faults (C) and (D), makes an acute triangle of purple slates with a small isolated outlier of limestone, near the apex, on the eastern side. On the south side of fault (E) the limestone occurs in three distinct outcrops, each cut off by this fault on their northern side. The most westerly outcrop crosses a line of fence (Sections 63 and 64) near the head of a small gully. This outlier of limestone is cut by faults on three sides; the main strike fault (C), on the west; dip fault (E), on the north; and a second strike fault (J), which cuts it diagonally between faults (C) and (E). The limestone has an apparent dip of 65°, east-south-east, near its junction with the great strike fault, and as this makes the siliceous limestone occupy a superior position, it is probably a case of reversal of position, as seen in Section B (Plate xliii.), further to the north.

The small strike fault (J), which cuts the beds diagonally, has the effect of repeating the beds on the eastern side; so that on the rise of the hill the lower impure calcareous beds outcrop, with the main limestone both above and below them. The limestones have a trend towards the main fault (C), by which they are ultimately cut out in Section 19.

Following the line of (E) fault, in an easterly direction, it is obscured by cultivated ground, derived from the weathering of the purple slates, until passing over a low rise, a little east of the four cross-ways on the district roads, the outcrops are once more strongly marked as we descend to Long Gully. On the south side of Section 65, and crossing the east-and-west road, there is another short length of good limestone. The effect of fault (E) is seen in its easterly extension in cutting off this outlier on the north, whilst the limestone is circumscribed by another fault (K), on the south. The beds nipped in between faults (E) and (K) have suffered a strong twist towards the north-east.

A further fault (L), in conjunction with fault (K), has brought in another wedge of purple slates, which displaces the calcareous beds in Sections 75 and 66.

The limestone in these respective outcrops shows the characteristic features of the bed. It is commonly, finely oolitic in structure, and in shades of pink, blue, white, or brown. In contact with the main faults it is much altered, passing into yellowish, dolomitic, and ferruginous rock, whilst in parts still preserving its oolitic structure. In places a distinct fault rock is developed, calcareo-siliceous and jaspery. The purple slates on the line of junction become yellow, laminated, calcareous, and kaolinised slates, much weathered. The fault planes are more or less marked by quartz veins, carbonate of iron, and nodular brown ironstone.

There are no doubt other minor faultings in this field, not clearly defined, but suggested by the stratigraphical features that prevail.

Siliceous and Earthy Limestones and Calcareous Shales. These beds directly underlie the main limestone, and are of much greater thickness. They exhibit in the Onkaparinga district the same wavy and vermiculate structure which characterises the corresponding beds further north. Throughout the district they participate in the same general displacements as have occurred with the main limestone which immediately overlies them.

From the Field River they can be clearly followed through the township of Reynella; but southward of that township, at Morphett Vale, and extending beyond Hackham Post-Office, they are for the most part obscured by a thick cover of tertiary beds.

A little south of Hackham, in Section 32, an old quarry face is seen on the east side of the road, near the top of the rise. The stone is a siliceous banded limestone, with characteristic structure, having an exposed vertical face of about 15 feet, dipping east-south-east, at 15°. On the eastern side, the siliceous limestone is obscured by Miocene sands; but the former rapidly widens to the southward, and spreads out into a series of beds, measuring a quarter of a mile across the strike.

At Hackham main limestone quarry the siliceous limestones are seen to occupy the rise of the hill above the limestone; whilst on the low side of the hill they are also seen to underlie the limestone, which is their normal position. The respective dips of the main limestone and the impure calcareous beds which outcrop on its eastern side are discordant: the limestone dipping east-south-east, at a low angle, and the impure calcareous series, south-west, at 35°. On the north-and-south district road, near the eastern limits of the outcrop, the dip of the last-named beds is reversed to south-east, at 33°. This repetition of the impure calcareous

series, so as to outcrop on both sides of the limestone, together with collateral evidence, proves the existence of the important strike fault (A), already described.

At the head of the gully road (going down to the ford of the river), the beds displaced by the fault (B) are cut diagonally by the strike fault (C). At this point the impure limestones, underlying the main limestone, form a small triangular patch on the east side of the fault, but are cut out, about one-third distance down the hill towards the river. They occupy most of the ground bounded by the faults (C), (D), and (F), and can be well studied in the gorge of the river and its tributaries within the space named. Where they are cut by the fault (F), in Long Gully, the beds are strongly banded, and dip south-east, at 10°. Towards the mouth of Long Gully the dip changes to north-west, at 30°, and then increases to 65°-70°, with wavy and vermiculate structure strongly shown at the junction of the creek with the Onkaparinga.

Higher up Long Gully, near the east-and-west district road, these beds have a great spread on both sides of the creek. On the west side the beds are intersected by several faults, and make a sudden curve to the east; whilst on the east they occupy the entire space stretching to the Onkaparinga.

From the first appearance of these siliceous and earthy limestones in the bed of the Onkaparinga, near the Ford, they continue to form the cliffs of the river for more than a mile, measured in a straight line up the stream. Immediately underlying the main limestone. are very siliceous and earthy beds, which dip west, at 73°, and are thrown into acute anticlinal and synclinal folds, reaching high angles, from 55° to 70°, as far as the outlet of Long Gully, in Section 57, where the beds are more calcareous. On the eastern side of this tributary the dip is 45° east, passing into a syncline at low angle. The turn of the river to the northwards, in Section 49, makes its course almost co-incident with the strike of the beds, until the river bends in a north-east direction, and at the curve the beds are seen to be vertical. The dip then passes to the south-west and then to the south-east, in rolling curves of about 20°, in Section 50.

In Sections 43 and 51 the beds partake more of the character of banded calcareous slates, with a dip west, at 40°, and mark the passage from the siliceous limestones to the Tapley's Hill slates, although the transition is gradual, and by no means strongly marked. The cleavage planes are almost at right angles to the bedding, with a strike of 10° west of south. The dip of the beds increases, from the posi-

tion last referred to, reaching 53° in a direction south, 20° west. The dip of these banded shales preserves a consistent direction to some point between west and south-south-west. Half-way through Section 44 the "slates" weather on the bedding planes, and split into fine laminæ, whilst at the same time exhibiting cleavage planes. The dip is here towards the south-south-west, at 28°, but within a short distance the dip becomes 76° west, and the bedding planes are extremely wavy and finely contorted. At the beginning of Section 857 the beds assume an almost horizontal position, and then are reversed to south-south-east, at 20°. They roll, in gentle curves, for a short distance, and then pass out of sight under the Glacial (Cambrian) Till, with a dip of 30° in the direction last named. The junction of these beds occurs between Sections 857 and 856, at a point in the river where two small tributaries, one on either side of the valley, enter at right angles to the main stream. This occurrence of the till, in a position superior to the Tapley's Hill slates, is manifestly a reversal in which the older beds have broken through and slid over the newer in a thrust plane of a quarter of a mile exposure. The entire plane of displacement cannot be estimated, but a mile higher up the stream the base of the glacial beds is seen to rest in a normal manner on the laminated quartzites in the true order of succession.

V. Southern Extension of the Calcareous Series.

It has already been stated that, in Section 75, the beds are cut off by a dip fault. From this point southwards, along the strike of the beds, the country is largely covered with tertiary deposits of loose sand, ferruginous sand, grits, and gravels, which almost entirely mask the older beds. That these tertiary deposits include the marine Eocenes, in some localities, is proved by characteristic fossils of this age being found on cultivated ground belonging to Mr. A. Oliver, of Taranga Farm, situated one and a half miles north of Bellevue. Stones carrying numerous casts of *Turritella aldingæ* are turned up by the plough, and have been in sufficient quantity to supply the material for building the farm house.

Notwithstanding the blinding of the older rocks by these superficial deposits, the Cambrian limestone outcrops in Mr. W. Oliver's vineyard (Section 85). The stone is a good, strong limestone, and has been used for building a very substantial house on the grounds.

The eastern limits of outcrop of these calcareous beds passes a little west of Bellevue. In the creek behind Bellevue, earthy shales are exposed in a low face, with a dip east-south-east, at 45°. The western limits of the calcareous belt,

at this point, can be found on Mr. Philip Seaman's farm, adjoining the Willunga main road, with a quarry on Section 102, where the stone is a massive, blue, calcareous shale, slightly banded and penetrated with veins of white calcite. The dip is here 15° south-west. Following down the creek, in the sides of which the quarry is situated, at a distance of three-quarters of a mile (in Section 122), near a grove of almond trees, the limestone has again been slightly quarried for building purposes. The general dip is like the preceding one, 15° south-west, but the quarry face shows a sharp monoclinal fold, which throws the beds down, for a distance of about three feet, at an angle of 45°, when they again resume the lower angle of dip.

About half a mile lower down the creek (Section 131) the western limits of the calcareous belt is clearly defined by the junction of massive quartzites and purple slates, seen in Pedlar's Creek. From Pedlar's Creek the beds become more shaley, and are exposed in rough, serrated outcrops, the strike having a south-westerly trend, and no evidence of good limestone across their strike. About half a mile from the creek, following the strike, they pass under deep cultivated ground and sandy country, but pieces of travertine can be seen in the soil in the direction of the strike, for about a mile, or even more, from the last occurrence of the rock *in situ*.

The calcareous series, including both the good limestone and impure calcareous beds, gradually decrease in breadth in their southerly extension from the Onkaparinga, until in Section 170, a distance of five and a half miles south of the river, they are only a few hundreds of yards wide, and are also more earthy in composition, features which seem to indicate that the calcareous beds may die out in their south-westerly strike.

DESCRIPTIONS OF PLATES.

Plate XXXVII.

Great anticlinal fold in earthy, siliceous limestones. Field River. Height of face, about 150 ft.

Plate XXXVIII.

Thin quartzite beds in purple slates, showing inverted fold. Field River.

Plate XXXIX.

Greatly contorted purple slates and thin quartzites. Curlew Point (north side), Gulf St. Vincent.

Plate XL.

A nearer view of part of the preceding section at Curlew Point (north side).

PLATE XLI.

Contorted rocks of the same series, on the south side of Curlew Point.

PLATE XLII.

Contorted rocks, on the same strike as the preceding, situated one-eighth mile north of Curlew Point.

PLATE XLIII.

Fig. 1. Section in Field River, from South Road to Hallett's Cove. Length, 3½ miles.

Fig. 2. Section in the Onkaparinga River, from the Horseshoe (Noarlunga) to the outcrop of the older glacial beds. Length, 4½ miles.

Fig. 3. Section A, as shown on map, from South Road to Long Gully. Length, 1¾ miles.

Fig. 4. Section B, in first gully below the Ford.

PLATE XLIV.

Geological map of the Lower Onkaparinga.

FURTHER NOTES ON AUSTRALIAN COLEOPTERA, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES.

By the Rev. T. BLACKBURN, B.A.

[Read October 4, 1904.]

XXXIV.

LAMELLICORNES.

TROGIDES.

These insects form the sixth of the seven "tribes" into which Lacordaire divided the first of his main divisions of the *Lamellicornes*. He separated that tribe from all the others on the ground of there being only five ventral segments in the abdomen of the insects that compose it. The tribe is widely spread over the world, but not rich in *genera*. Its members are for the most part scavengers, feeding upon offal of all kinds, and therefore are, on the whole, to be regarded as useful to mankind. As might be expected from their habits, the species are easily disseminated from one land to another, and some of them have become cosmopolitan. In the following pages I have to record the occurrence in Australia of a species (not previously recorded in Australia) whose home is in Europe.

Five genera of *Trogides* have been recorded as Australian —*Megalotrox*, *Trox*, *Liparochrus*, *Antiochrus*, and *Acanthocerus*. The last named is distinguished from the four others by its body being contractile. Its place in the Australian catalogue rests on the foundation of a single species (*A. spinicornis*), described by Fabricius, who, however, does not seem to have been very confident as to its *habitat*. I have never seen any Australian *Acanthocerus*, and am not aware of any reliable authority for attributing *A. spinicornis* to this continent. Consequently I have nothing definite to say about it. The validity of one of the remaining *genera* (*Antiochrus*) has been challenged by the Baron de Harold, who considers it identical with *Liparochrus*, but it appears to me to be very satisfactorily distinct, and I have therefore retained the name. *Megalotrox* differs from the normal structure of *Trox* in the great size of its hitherto described species, in its being apterous (with elytra soldered together), in its small scutelium deeply sunk in the base of the elytra, in the wide epipleuræ of its elytra, in its short metasternum. Nevertheless I am in doubt of the generic validity of this aggregate on account of the presence in my collection of a specimen from Tasmania which is intermediate between it

and ordinary species of *Trox*. The specimen in question is comparatively small (Long. 7 l.), and has elytra not soldered together and wings (short ones, as far as I can see), but presents all the other characters mentioned above as those of *Megalotrox*. It may be noted that Lacordaire states that in his opinion the presence or absence of wings has no importance in *Trox*. Under these circumstances, if *Megalotrox* is to stand as a good genus, another new generic name will be required for my Tasmanian specimen; but as the latter distinctly connects *Megalotrox* with *Trox*, and it is probable that other intermediate forms will yet be discovered, it seems better for the present to regard *Megalotrox* as a subgenus. For the present, at any rate, then, I am not satisfied that Australia possesses more than three valid genera of *Trogides*, viz., *Trox*, *Liparochrus*, and *Antiochrus*, which can be distinguished as follows:—

A. Antennal club normally lamelliform	Trox.
AA. Basal joint of antennal club subcupuliform.	
B. Elytra normally striate	Liparochus.
BB. Elytral with a wide lateral margin which is closely striate, in contrast with the general surface	Antiochrus.

N.B.—I ought to add here that I have not seen the type of *Antiochrus*, which is presumably in Europe, but have identified it from Dr. Sharp's description, so that there is a bare possibility of my identification being incorrect.

Trox.

This genus is very widely distributed over the earth, and some of its species have been introduced into so many lands that they have become more or less cosmopolitan. Lacordaire says that America is the continent where *Trox* is most plentiful. Species found in Australia have been described under 34 names, 7 of which I believe to be merely synonyms or names which are incapable of being referred to any particular species. These are discussed below. In the following pages I purpose supplying a tabulation of the distinctive characters of the known Australian *Troges*, together with some notes on synonymy, etc., a note on an introduced species, and descriptions of 6 new species. A certain number of the names are connected with descriptions so brief or vague as to be practically useless. These are all, I think, from the pens of Mr. W. S. Macleay and Sir W. Macleay, and it would be of little advantage to furnish a revision of the genus without giving some account of these difficulties, which I am the better able to do, as an opportune need for visiting Sydney has enabled me to spend a couple of days in studying the *Trogidæ* of the "Australian" and "Macleay"

Museums. Unfortunately, the results of that visit are unsatisfactory for the Macleayan species, as I find that the types do not bear tickets enabling them to be identified. In both Museums each name is written, together with a mention of the *habitat*, on a slip of paper laid on the surface of the cabinet drawer, into which slip are pinned all the specimens supposed to be of that species, the individual specimens being without separate tickets. I now proceed to supply information regarding the separate species, and regarding some others that seem to call for remark.

T. alternans, W. S. Macl. There is no specimen in either of the Sydney Museums bearing this name, and Mr. Masters is satisfied that the type is not in existence. Harold, without giving his reasons, assumes it to have been the insect which Erichson described as *T. Australasiæ*, and consequently drops *Australasiæ* as the later name. It, however, appears to me quite indefensible to sink a name connected with a good (and easily identified) description in favour of a name connected with a description that might be founded on any one of a considerable number of species, unless it be definitely stated that the change is founded on an examination of the original type. I shall, therefore, treat *T. alternans*, W. S. Macl., as non-existent.

T. subcarinatus, Macl. In the Australian Museum two specimens stand pinned into this name. One of them is the species that Harold subsequently described as *T. fenestratus;* the other is so covered with accretion that it is impossible to identify it with certainty, but I think it is *T. Crotchi*, Har. In the Macleay Museum also two specimens are similarly attributed to the name, one of which is *T. fenestratus*, Har.; the other, *T. candidus*, Har. The last named is evidently not the type, as it is notably smaller than the specimen that Macleay described. *T. subcarinatus*, Macl., is, therefore, identical with either *fenestratus*, Har., or *Crotchi*, Har. The description of *subcarinatus* does not supply information to decide the matter, although it appears to me to point to *Crotchi*, as it seems unlikely that if it had been founded on the same species as *fenestratus* the nitid spaces on the elytra would have escaped notice. I am afraid, however, that there is not sufficient evidence to justify the sinking of either of Harold's names, and that it is the name *subcarinatus* which must be dropped. It may be well to remark here that the *Trox* which Harold described as *subcarinatus*, Macl., is not that species, but *squamosus*, Macl.

T. alatus, Macl. There are two specimens thus named in the Macleay Museum. They represent a very remarkable and isolated species, notable by the great width of the pro-

thorax (almost twice as wide as long), by the sides of the pronotum extremely flat and dilated, by the reduction of all the carinæ of the pronotum except the middle two to mere small tubercles, by the third and fifth systematic series of the elytra being entire carinæ, by the all but absolute disappearance of the median external tooth of the front tibiæ and by the strong free projection hindward of the prosternal process.

T. asperatus, Macl.—Two specimens stand in the Macleay Museum as this species. They both appertain to the species that Harold named *Crotchi*. The latter is the older name.

T. dilaticollis, Macl. Two specimens in the Macleay Museum bear this name. They represent a species closely allied to *T. Augustæ*, Blackb., but differing from it in having on its elytra well-defined rows of small setose tubercles (scarcely less defined than those of *T. fenestratus*, Har.).

T. asperrimus, Macl. Two specimens in the Macleay Museum are pinned into the ticket bearing this name. I cannot find any difference between them and the specimens (from the same locality) pinned into the next label (bearing the name *vitreomaculatus*) except that the two of the former name are more deeply covered with the indumentum usually obscuring the sculpture of these insects, and therefore seem to have less defined carinæ on the pronotum, etc. As the name *asperrimus* is evidently founded on the presence of the indumentum and *vitreomaculatus* is a good descriptive name I propose retaining the latter, the two being of same date.

T. salebrosus, Macl. Two specimens in the Australian Museum and one specimen in the Macleay Museum stand as this species. One of them has the carinæ of its pronotum blunter than the corresponding carinæ in the two others, and there is some variation in the brilliance and conspicuousness of the nitid spaces on the elytra (which, however, might not be the case if the specimens were effectually cleaned). I am unable to find any good character distinguishing them from *vitreomaculatus*, Macl., and I consider them identical with that species.

T. semicostatus, Macl. Two specimens attributed to this name are in each of the Sydney Museums. The species is a very distinct one, allied to *Crotchi*, Har., but very much smaller, and having all the alternate elytral series continuously costiform in their basal half.

T. nodicollis, Macl. Two specimens pinned into the ticket bearing this name in the Macleay Museum are somewhat closely allied to *fenestratus*, Har., but, *inter alia*, are much smaller and have the intervals between the systematic series of the elytra much more roughly sculptured.

T. Castelnaui, Lansb. This, I have no doubt, is a mere variety of *gigas*, Har. No distinctive character is mentioned in the description that appears to me at all likely to be specific.

T. Tatei, Blackb. This insect was originally described as possibly a variety of *gigas*, Har. Subsequently to my publication of the name I have identified the true *gigas*, and find that it is perfectly distinct. As I did not describe *T. Tatei* as a species, I include it among the species to be described below.

T. carinatus, Har. Its author states that this insect is a variety of *T. Australasiæ*, Er.

T. squamosus, Macl. This name is represented by two specimens in each of the Sydney museums. They are the species which Harold called *T. subcarinatus*, Macl.

T. Australasiæ, Germ (nec. Er.). Germar's brief description under this name is not sufficient for its confident identification, but there can be little doubt of its having been founded on *T. litigiosus*, Har., which is plentiful in the locality where Germar's specimen was found, whereas *T. Australasiæ* Er., does not, so far as I know, occur there.

Before passing to the tabulation of the distinctive characters of the Australian species of *Trox* it seems desirable to offer some general remarks on the specific value of some of those characters, and on some of the terms that I have used to indicate them. The Australian species of *Trox* are remarkably variable in respect of some of their superficially most conspicuous features, but very constant in respect of certain others. Like most strongly tuberculated *Coleoptera* the development of the tubercles is decidedly variable, specimens being very often met with in which the tubercles are not identical on the two elytra, *e.g.*, there are often two rows cariniform at the base on one elytron, and only one on the other: often a cariniform basal part of a series is much longer on one elytron than on the other. The external teeth of the front tibiæ are variable in number, specimens being frequent in which the number is different on the right and left tibiæ. Each species certainly seems to me to have a *normal* number of teeth—1, 2, 3, or more—and I do not find that variation tends to default but only to *excess* of teeth, but it is certainly not at all rare in this respect. The structure of the prosternum behind the coxæ is certainly variable, though not frequently so. I have examples before me of several species having the middle of the prosternum normally produced in a small angle behind the coxæ, in which this angle is quite wanting. It must further be noted that the Australian species of *Trox* are liable to a remarkable blunting of the sharper prominences of their structure. Whether this

is due to imperfect development or to some attrition to which the parts in question have been exposed by the habits of the insects I cannot say, but it is certain that specimens are frequent in which sharp teeth on the tibiæ are represented by mere blunt sinuosities, and sharp carinæ on the pronotum and conical tubercles on the elytra are represented by corresponding blunt elevations having all the appearance of having been rubbed down. Perhaps it may be thought that I may be in error in regarding these variations as non-specific, but I can say positively that they are so, as I have found them in varying degrees in specimens differing in no other way and taken in company. All the above characters have been treated as specific in most of the published descriptions of these insects, doubtless through the descriptions having been founded on the inspection of only one or two specimens, and doubtless they are specific if regarded merely as indicating the *normal* characters, but they are clearly not available for reliable identification of the species.

The following characters I have found invariable, and as I have examined large numbers of specimens of some species they must at any rate be only very rarely variable:—The setulose vestiture, the texture of the inequalities of the surface (whether glabrous and nitid, or more or less setiferous, or more or less punctulate, or of an apparently spongiose tissue), the relation of the subsutural carina of each elytron to a short basal carina which borders the external margin of the scutellum: in some species the latter is straight and altogether disconnected from the former, in others the former is bent outward at the apex of the scutellum and runs forward in a curve to meet the latter (it must be noted that the subsutural carina, so-called, is not always a continuous carina, but may be broken into short pieces not quite touching each other), the general disposition of the elytral tubercles. Regarding this last-named character it is to be observed that it is quite distinct from the question of the size and shape of individual tubercles, or the extent to which this and that tubercle are run together into a short carina (which, as noted above, are very variable). To make this clear it is necessary to adopt a name for the tubercular series of the elytra. If an elytron of almost any Australian *Trox* be examined there will be seen ten longitudinal ridges of some kind: in almost all the species they are more or less tuberculiferous, and may or may not be the intervals between defined striæ: the first of them is close to the suture (I have called it the subsutural carina), the third is almost always, and the fifth is frequently, a narrow, continuous carina in its basal part. These ten ridges I have called the "systematic series," in Latin "series normales." In many

species there are also numerous small granules or large punctures, either without order or in sinuous or straight rows, interspersed among the systematic series, but in no case known to me capable, on careful inspection, of confusion with the latter. In a single species (*T. Brucki*, Har.) some of the systematic series are wanting, in a few species the systematic series are all similar *inter se*, in most of the species they (especially their tubercles) are alternately larger and smaller. Among these, the second, fourth, etc., series are the larger in some species, the third, fifth, etc., in other species. In these elytral characters I have found no tendency to variation. An invariable specific character is to be found also in the degree of declivity of the antero-lateral part of the elytra connected with the comparative prominence and shape of the humeral callus and the development of the front part of the sublateral systematic series; but these characters are difficult to express in words, though easy to appreciate when specimens are examined. To this extent, however, the character just mentioned can be used with advantage; if a *Trox* be looked down upon from exactly above it (so that the two lateral margins appear symmetrical) in some species (the less convex ones) the whole of the actual margin is visible on both sides as an even line, but in others its front part, from the point of view indicated, appears on both sides interrupted by its own deflexion or by the protrusion (beyond its outline) of the outline of the humeral callus or of the tubercles of the sublateral or lateral systematic series.

I should add that I have not found very satisfactory characters in the prothorax. The sinuosity of the margins of that segment is extremely variable within the limits of a species, as also the sharpness of the sculpture of the pronotum. Undoubtedly there are species in which the normal condition of the lateral margins is strongly and others in which it is feebly (or not) trisinuate, species in which normally the hind angles are well developed, and others in which they are normally more obtuse; but I have not succeeded in discerning any really workable distinction in these characters in more than two or three species. The greater or less declivity hindward of the part of the pronotum in front of the basal lobe seems to be a character calling for attention in identifying species.

Attention must be called to the fact that it is impossible to form a correct idea of the sculpture of a *Trox* without the removal of the indumentum, with which almost all specimens are coated. This generally requires the use of a strong brush (such as a tooth-brush), which, fortunately, the hard texture of the body renders practicable without injury to the specimen.

Tabulation of the Known Australian Species of Trox.

A. Without wings for flying; elytra soldered together (Megalotrox).
  B. Lateral margins of elytra deeply serrate.
    C. Projections of elytral margins blunt. Size moderate (long, about 10 l.) ... ... Dohrni, *Har.*
    CC. Projections of elytral margins acute. Size much larger ... gigas, *Har.*
  BB. Lateral margins of elytra (at most) lightly crenulate.
    C. Head very closely (almost confluently) punctulate ... ... Elderi, *Blackb.*
    CC. Head sparsely punctulate ... Tatei, *Blackb.*
AA. Winged: elytra not soldered together (Trox).
  B. Epipleuræ of elytra much wider than in the following species ... tasmanicus, *Blackb.*
  BB. Epipleuræ of elytra comparatively narrow.
    C. The middle two carinæ of pronotum conspicuously abbreviated behind.
      D. Elytra with about 20 conspicuous lines of short, bright tulvous setæ.
        E. The elytral setæ fasciculated on the prominences of the systematic series.
          F. The prominences of the systematic series of the elytra are scarcely marked ... ... Augustæ, *Blackb.*
          FF. The prominences of the systematic series well defined ((almost as in *T. fenestratus*, Har.) ... dilaticollis, *Macl.*
        EE. Elytral setæ evenly distributed (nowhere fasciculated), and notably longer than in "E" ... ... setosipennis, *Blackb.*
      DD. Elytra not as in D.
        E. Elytral tubercles (unless at their extreme apex) nitid, glabrous, and punctureless.
          F. Subsutural carina of elytra continues along sides of scutellum and inner part of elytral base.
            G. Lateral margins of prothorax crenulate (form of body very wide, tending to sub-circular) ... ... eremita, *Blackb.*

GG. Lateral margins of prothorax not crenulate (form of body much more ovate) ... Crotchi, *Har.*

FF. Subsutural carina of elytra not continuous with the short carina on either side of scutellum.

G. The elytral prominences of largest area are in 3rd, 5th, etc., systematic series.

H. 3rd, 5th, and 7th systematic series of elytra costiform in about their basal half (size small) ... ... semicostatus, *Macl.*

HH. Systematic series of elytra very little costiform.

I. Subapical external tooth of front tibiæ much smaller than apical tooth ... eyrensis, *Blackb.*

II. Subapical external tooth of front tibia about same size as apical tooth ... quadridens, *Blackb.*

III. Subapical external tooth of front tibia all but non-existent alatus, *Macl.*

GG. The elytral prominences of largest area are in the 2nd, 4th, etc., systematic series.

H. Hind tibiæ normal .. stellatus, *Har.*

HH. Hind tibiæ strongly incurved in their apical part ... .. curvipes, *Har.*

EE. Most (or all) of the elytral tubercles entirely (or nearly so) spongiose or setulose or punctulate.

F. Lateral margins of elytra in front part (viewed from above, and so that both are seen symmetrically) form an even line.

G. Subsutural carina of elytra continues along sides of scutellum and inner part of elytral base.

H. The alternate systematic series of the elytra very different from the others.

I. All the systematic series of the elytra tuberculiferous.

J. Two distinct rows of well-defined punctures between 1st and 3rd systematic series ... ... fenestratus, *Har.*

JJ. Space between 1st and 3rd systematic series occupied by confused rugulosity nodicollis, *Macl.*

II. Alternate systematic series devoid of tubercles ... Brucki, *Har.*

HH. All the systematic series of the elytra similar (or nearly so) *inter se.*

I. Lateral margin of elytra narrow and subvertical ... velutinus, *Blackb.*

II. Lateral margin of elytra wider and flattened (as in *litigiosus*, Har.) ... insignicollis, *Blackb.*

GG. Subsutural carina of elytra not continuous with the short carina on either side of scutellum.

H. Size moderate or large (5½ l. or more).

I. Subapical callus of elytra quite strongly prominent (both externally and internally) and bearing two of the largest tubercles of the elytra ... litigiosus, *Har.*

II. Subapical callus of elytra but little prominent, and bearing comparatively small tubercles.

J. The elytral tubercles of largest area are on 2nd, 4th, etc., systematic series, and are nitid ... strzeleckianus, *Blackb.*

JJ. Elytral tubercles not as in J.

K. Elytra not having conspicuous nitid black spaces.

L. Apical dilatation of front tibiæ bifid euclensis, *Blackb.*

LL. Apical dilatation of front tibiæ entire ... mentitor, *Blackb.*

KK. Elytra having numerous conspicuous nitid black spaces tricolor, *Blackb.*

HH. Size very small (4 l. or less) ... ... vitreomaculatus, *Macl.*

FF. Lateral margins of elytra in front part (viewed from above) interrupted by projection of humeral callus or of tubercles

G. Intermediate and hind tibiæ unarmed or finely crenulate, externally.

H. Prothorax very evidently at its widest considerably in front of middle ... ... squamosus, *Macl.*

HH. Prothorax at its widest at, or behind, the middle.

I. Tubercles of elytra unusually few in number and large Australasiæ, *Er.*

II. Tubercles of elytra much more numerous and smaller candidus, *Har.*

GG. Intermediate and hind tibiæ with some conspicuous, well-defined external teeth ... perhispidus, *Blackb.*

CC. Middle two keels of pronotum not definitely abbreviated behind.

D. Antennal club dark; form wide and rounded: long. 4 l. sabulosus, *Fab.*

DD. Antennal club lighter: form narrow and parallel: long. 3 l. scaber, *Illig.*

T. (Megalotrox) Tatei, Blackb. Late ovalis; sat convexus; niger; capite sparsim fortiter punctulato transversim obtuse nec alte carinato; prothorace quam longiori ut 6 ad 4 latiori, postice lobato, supra costis tuberculisque crassis inæquali, sparsim punctulato (partibus lateralibus crebre granulatis), postice quam antice ut 13 ad 8 latiori, angulis posticis subrectis, lateribus arcuatis crenulatis; elytis confuse granulatis et tuberculorum magnorum obtusorum seriebus 3 (et tuberculorum multo minorum serie subsuturali) ornatis, lateribus subtiliter crenulatis; tibiis anticis extus tridentatis, dente apicali bifido. Long., 13 l.; lat., 8 l (vix).

At once distinguishable from the other *Troges* of the section *Megalotrox*, except *Elderi*, Blackb., by the lateral margins of its elytra being only finely crenulate, and from *Elderi* by its much narrower and more convex form, its much less transverse prothorax, its much more sparsely punctured and more uneven head, and its pronotum much less closely punctured and having much thicker carinæ and tubercles, which are, indeed, so wide that there can scarcely be said to be any distinct flat intervals between them, whereas in *Elderi* the prominences on the pronotum are narrow and separated from each other by wide, flat intervals.

S.W. parts of South Australia.

T. tasmanicus, sp. nov. Alatus; minus late ovatus; fere glaber; minus nitidus; niger; capite ruguloso-punctulato, fronte bituberculata; prothorace quam longiori ut 8 ad 5 latiori, supra fere ut caput punctulato, longitudinaliter carinis 6 nitidis fortiter elevatis instructo (carinis medianis 2 sinuatis postice fortiter abbreviatis, intermediis fortiter sinuatis in medio interruptis, externis interruptis et in dimidio pronoti antico carentibus), ad latera late explanato, margine laterali sat æqualiter arcuato incrassato grosse punctulato, angulis omnibus obtusis, basi latissime rotundatim modice fortiter lobata; scutello minori, depresso; elytris valde inæqualibus, serierum normalium tuberculis nitidis (nonnullis sat grosse punctulatis) 1ae parvis (haud cum carina scutellari continuis) 3ae 5ae 7ae que magnis (serie 3a ad basin breviter cariniformi) 9ae parvis ceterarum granuliformibus cum granulis aliis inæqualiter commixtis, marginibus lateralibus totis sat fortiter serratis, epipleuris perlatis nitidis minute granuliferis: metasterno brevi; tibiis anticis extus inermibus, posterioribus 4, crenulatis, prosterno pone coxas subtruncato. Long., 7 l.: lat., 4½ l.

The only winged Australian species yet described or known to me having the broad elytral epipleuræ and short metasternum of the large species for which M. de Borre proposed the name *Megalotrox*.

Tasmania.

T. setosipennis, sp. nov. Alatus: minus late ovatus; minus opacus: niger vel piceus vel rufo-piceus, antennarum clava rufa; supra setis subtilibus læte fulvis (in pronoto quam in elytris magis brevibus, in his ut series circiter 20 sat regulares dispositis nec in ulla parte fasciculatis) vestitus: subtus partibus nonnullis rufo ciliatis: capite puncturis setiferis sat grossis nec crebre nec fortiter impresso, fronte bituberculata: prothorace quam

longiori ut 13 ad 8 latiori, supra fere ut caput punctulato sed paullo magis fortiter, fere ut *T. tasmanici*, Blackb., carinato sed carinis obtusis multo minus elevatis, ante lobum basalem medianum sat fortiter declivi, margine laterali fortiter trisinuato, angulis anticis sat obtusis posticis sat acute rectis, basi utrinque profunde late emarginata (lobo mediano triangulari); scutello modico lanciformi; elytris vix perspicue tuberculatis, seriebus normalibus 1ª 3ª, etc., obtuse leviter convexis 2ª 4ª, etc., sat planis sed pustulis magnis nitidis nonnullis vix elevatis ornatis, intervallis inter series normales longitudinaliter seriatim foveatis, seriebus ipsis longitudinaliter seriatim sat subtiliter punctulatis, serie 1ª antice haud ut carina ad scutelli latera continua, callo subapicali minus elevato; tibiis anticis extus bidentatis; prosterno medio pone coxas acuto minus producto. Long., 7 l.; lat., 3 $\frac{1}{5}$ l.

This species, *T. dilaticollis*, Macl., and *T. Augustæ*, Blackb., are easily distinguishable from all the other Australian species of *Trox* known to me by the numerous and conspicuous rows of fine, brightly fulvous setæ on their elytra. They resemble each other considerably, but are separated by good characters—the inequalities of the pronotum being in the other two species strong cariniform ridges, in this one feeble obtuse convexities: the subsutural carina of the elytra being in the other two continuous along the sides of the scutellum, in this species widely disconnected from the short elevation that margins the sides of the scutellum in their front part: the elytral setæ being very evidently shorter, less erect, in the other two than in this species, those setæ, moreover, in the other two not being regularly spaced (on account of two or three setæ being placed close together here and there as a fascicle on the apex of a scarcely defined tubercle), while in the present species each seta is isolated, and all are very equally separated *inter se*.

South Australia (Yorke's Peninsula).

T. eyrensis, sp. nov. Alatus: sat late ovatus: fere glaber; minus nitidus; niger, capite subtus et pedibus capillis nonnullis rufulis vestitis, antennarum clava rufa: capite sat crebre subfortiter vix rugulose punctulato, fronte bituberculata: prothorace quam longiori ut 13 ad 8 latiori, supra fere ut caput sed paullo magis rugulose punctulato, fere ut præcedentis (*T. tasmanici*) carinato, ad latera sat late explanato, ante lobum basalem medianum fortiter declivi, margine laterali ante medium haud vel leviter (pone medium leviter) sinuato, angulis anticis

nonnihil subacutis posticis subrectis, basi utrinque bisinuata (lobo mediano modico postice sat rotundato); scutello modico lanciformi: elytris tuberculato-inæqualibus, serierum normalium tuberculis nitidis lævibus (nonnullis postice ad apicem spongiosis) 3ᵃ sat parvis 5ᵃ 7ᵃ 9ᵃ gradatim magis parvis ceterarum granuliformibus, granulis minutis (vel puncturis) inter series normales lineatim sinuatim dispositis, serie 3ᵃ breviter (5ᵃ haud vel vix) ad basin cariniformi, 1ᵃ ad basin haud ut carina ad scutelli latera continua, callo subapicali minus perspicuo: tibiis anticis extus dentibus 3 bene definitis armatis (dente apicali quam alii multo majori): prosterno medio pone coxas minute acuto. Long., 6½ l.: lat., 4 l.

The nitid punctureless tubercles of the systematic series on the elytra (some of them nevertheless being spongiose on a small area at the hinder part of their apex), together with the subsutural systematic series not at the base becoming cariniform and continuous along the sides of the scutellum, distinguish this species from all others bearing a general resemblance to it except *quadridens*, Blackb., which it closely resembles, though I am quite satisfied that the two are valid species. *Eyrensis* (which I have seen only from the southwest coast of Australia) has the sides of its prothorax evenly arched (rarely slightly sinuate), from the front nearly to the base, and then feebly sinuate, while in *quadridens* (which I have seen only from north of Port Augusta) the sides of the prothorax are quite strongly trilobed. There is also a reliable distinction in the armature of the front tibiæ. In both species those tibiæ have three or more external teeth (not rarely 4 on one tibiæ and three on the other), but in *quadridens* the subapical tooth is fully as large as the apical, while in *eyrensis* the apical tooth is very much larger than the others. I find also that the tubercles of the systematic series in *eyrensis* have much more spongiose tissue than in *quadridens*. In the latter, those tubercles are (as in *T. Crotchi*, Har.) all but absolutely without it: while in the former the postero-apical surface of most of them is distinctly opaque and spongiose, with the result that, looked at obliquely from behind, *eyrensis* might almost be referred to the *litigiosus* group of species, while regarded obliquely from in front scarcely any opacity can be seen on the tubercles. Apart from the different character of the tissue of its elytral tubercles *eyrensis* bears considerable general resemblance to the larger species of the *litigiosus* group. In other respects, however, it differs from them, *inter alia*, as follows:—From *litigiosus*, Har., by the more numerous external teeth of its

front tibiæ (I have not seen any *litigiosus*, in a long series, which has on both tibiæ more than two teeth; two is undoubtedly its normal number), by the much less prominence of the subapical calli of its elytra (these in *litigiosus* both are more prominent in themselves and also bear on the third systematic series a conspicuous tubercle scarcely smaller than the largest tubercle of that series), and by the distinctly red club of its antennæ; from *strzeleckensis*, Blackb., by the largest and most nitid elytral tubercles being on (not the second, fourth, etc., but) the first, third, etc., systematic series; and from *mentitor* Blackb., by the much larger and much less numerous tubercles of its elytra. *T. euclensis*, Blackb., and *vitreomaculatus*, Macl., hardly need to be differentiated, the former having *inter alia multa* nearly all its elytral tubercles almost entirely opaque, and the latter *inter alia multa* being one of the smallest Australian species of the genus.

South-east parts of Western Australia.

T. mentitor, Blackb. This species is closely allied to *T. euclensis*, Blackb., and difficult to separate by characters that lend themelves to tabulation. The character that I have selected for tabulation is very satisfactory if constant, but as *mentitor* continues unique I hesitate to place entire reliance upon it, though I find the bifidity of the apical dilatation of the front tibiæ constant in *euclensis* (of which I have examined many specimens). *T. mentitor* is a species of more parallel form than *euclensis*, and the tubercles of its elytral series are smaller and much more numerous and closely placed than the corresponding tubercles in *euclensis*, while the small granules of the interstices between the systematic series run (not in sinuous lines as they do in *euclensis*, but) in perfectly straight lines.

T. tricolor, sp. nov. Alatus: sat late ovalis; sat opacus: niger vel piceo-niger, palpis antennisque rufis: supra in elytris (areis numerosis nitidis aterrimis exceptis) pube subtilissima creberrima brunnea et setis brunneis cinereisque minus perspicuis (his in tuberculis subobsoletis fasciculatis) vestitus: subtus partibus nonnullis rufohirtis vel ciliatis: capite sparsim granulato-punctulato, fronte bituberculata: prothorace antice angustato, quam longiori ut 13 ad 9 latiori, supra ut caput granulato-punctulato (puncturis minute setiferis), fere ut *T. tasmanici*, Blackb., carinato sed carinis perobtusis, ante lobum basalem medianum haud abrupte declivi, margine laterali pone medium profunde emarginato, angulis anticis subacutis posticis subrectis, basi fortiter trisinuata, lobo basali postice angulato: scutello cordi-

formi; elytris inæqualibus, serierum normalium 1ª 3ª etc., tuberculis minus perspicuis (horum aliis nitidis, aliis opacis), serierum 2ª 4ª, etc., tuberculis fere nullis, inter series normales (his basin versus vix cariniformibus) seriatim sat grosse punctulatis (nec granulatis), carina subsuturali ad basin haud ut carina ad scutelli latera continua, callo subapicali vix perspicuo; tibiis anticis extus bidentatis; prosterno medio pone coxas obtuse angulato. Long., 6 l.; lat., 3 $\frac{4}{5}$ l.

Owing to the feebleness of its sculpture, the place of this species in a tabulation is not very obvious without careful consideration. The nitid (and slightly elevated) spaces on the third, fifth, etc., systematic series are so much more conspicuous than the ill-defined pubescent tubercles between them that at first sight the latter (which are the true tubercles of the series) might almost be overlooked, and the subsutural carina is so nearly obsolete that it is not very satisfactory to have to attribute to it any character at all. But in all genera of numerous species such cases of difficulty are to be expected where characters that serve well for identifying most of the species are less available in the case of occasional feebly developed species. The second, fourth, etc., systematic series of the elytra are sub-obsolete, but not (as they are in *Brucki*, Har.) absolutely wanting. The species, however, is easy to recognise, if in good condition, by the peculiar colouring, on which I have founded the name. The elytra present the appearance of being chequered with patches of three colours: the nitid black squares in the alternate interstices, the dark brown derm, and the cinereous setæ on the tubercles that are alternated with the nitid black squares. Its structural characters also render *T. tricolor* incapable of confusion with any of its described Australian congeners, as it is the only one of those not having defined tubercles or granules in the second, fourth, etc., systematic series, having conspicuous nitid black spaces in the first, third, etc., series.

New South Wales. Taken near Sydney by Mr. Carter.

T. perhispidus, sp. nov. Alatus: sat late ovatus: sat opacus; niger vel piceo-niger, palpis antennisque (harum basi excepta) testaceis vel rufis: supra in elytris setis brevibus fulvis circiter 16 seriatim longitudinaliter ornatus (his in tuberculis fasciculatis) et in marginibus setis elongatis piliformibus ciliatus: subtus partibus nonnullis rufo-ciliatis: capite obscure nec crebre granulato, fronte bituberculata: prothorace quam longiori ut 3 ad 2 latiori, supra ut caput granulato (granulis minute fulvo-setiferis), fere ut *T. tasmanici*, Blackb., carinato sed carinis subobsoletis perobtusis,

ante lobum basalem medianum sat fortiter declivi, margine laterali vix sinuato, angulis anticis sat obtusis posticis fere (nec acute) rectis, basi utrinque profunde late emarginata, lobo basali lato postice rotundato: scutello sat lato sublanciformi; elytris tuberculato-inæqualibus, serierum normalium tuberculis modicis opacis (aliis elongatis, aliis subconicis), serierum 3ª 5ª 7ª 9ª tuberculis quam ceterarum majoribus, tuberculis setis fasciculatis brevibus ornatis, inter series normales granulis nonnullis setiferis instructis, seriebus 3ª 5ª que ad basin plus minusve cariniformibus (1ª ad basin haud ut carina ad scutelli latera continua), callo subapicali vix perspicuo; tibiis anticis extus bidentatis, intermediis dentibus 2 prope mediam partem bene definitis et aliis nonnullis minoribus, posticis crenulatis; prosterno pone coxas late nec acute prominenti. Long., 4½ l.: lat., 2½ l.

This is an extremely distinct species, and cannot well be confused with any other Australian member of the genus. The sculpture of the middle tibiæ (consisting of two well-defined teeth about the middle of the external margin and smaller teeth above and below) in itself distinguishes it from all its known Australian congeners. Also the fringe of elongate, hair-like setæ on the lateral margins of the elytra are unusual, as well as the 16 longitudinal rows of setæ on each elytron, many of which setæ are fasciculate on tubercles in the first, fourth, seventh, tenth, and thirteenth rows (in the sixteenth they are somewhat obscure and confused with the long marginal setæ). Other unusual characters are the exceptional feebleness of the inequalities on the pronotum and the width of the scutellum. The species is in some respects suggestive of the European *T. hispidus*, Laich., but very distinct, *inter alia multa*, by the strong convexity of its pronotum, and the deep emargination of the base of that segment on either side, which is almost as in *T. Australasiæ*, Er. The strong convexity of the humeral callus and the strong projection of the tubercles of the ninth systematic series cause the true lateral margin of the elytra to be hidden in the front part, when the insect is looked down upon from above (from the point whence the two sides are seen symmetrically), so that the lateral margins from that point of view appear jagged, as in *candidus*, Har., and some other species.

Northern Territory of South Australia.

T. sabulosus, Fab. I have found an example of this European species among some Australian *Coleoptera*, given to me by Dr. Pulleine some years ago, and there is every reason to believe that it was taken somewhere near Adelaide.

ON THE ABSORPTION OF α RAYS, AND ON THE CLASSIFICATION OF THE α RAYS OF RADIUM.

By W. H. Bragg, M.A., Elder Professor of Mathematics and Physics in the University of Adelaide.

[Read September 6, 1904.]

Abstract.

In a paper read at the Dunedin meeting of the Australasian Association for the Advancement of Science, in January, 1904, the author had compared the phenomena attending the absorption of α and β rays, and had shown that the following hypotheses were probably true:—

(1) The β ray is "absorbed" as it penetrates matter from two causes—*(a)* deflection due to close encounter with electrons of the atoms traversed; *(b)* expenditure of energy on ionisation.

(2) The α ray is "absorbed" from the latter cause alone. It followed that the α particle moved through matter without deviation until its energy was expended; that no dispersion attended its flight; that it had a definite range, depending on its initial velocity: and that, like any atom moving with more than ionising speed, it must become positive—even though neutral at first—from collision with ions traversed and consequent loss of one electron.

The author now described a number of experiments in support of these hypotheses. The principle of the method employed consisted in the isolation of a narrow cone or cones of α rays by suitable stops, and the examination of the ionisation produced by them at different distances from their source. This was accomplished by the use of a shallow ionisation chamber. The experiments might be divided into two classes, those with thick layers of radium and those with thin layers. In the former case he showed that a curve in which the ordinates represented distances from radium to ionisation chamber, and the abscissæ currents as measured in a quadrant electrometer—and which he termed the ionisation curve—should be a rectilinear polygon, on the following assumptions:—

(a) All α particles produced ions in proportion merely to distance traversed.

(b) α particles lost energy in proportion to matter traversed, so that such as came from lower layers of radium would lose speed before emerging.

(c) Radium in a state of equilibrium contained its radio-active products, each ejecting an equal number of α particles of definite speed, and therefore responsible for one of the sides of the polygon.

He showed that experiment proved this to be the case. He also described the following experimental results:—(1) De-emanated radium only emitted α particles of range about 3·3 cm. (2) A uniform layer cut off the same quantity from the range of all the α rays.

In the case of thin layers he showed that the curve should take the form of a series of steps, each step representing one radio-active change, and that this also was an experimental fact. Experiments with thin layers showed that:—

(1) De-emanation removed all the steps but one, that of height 3·3 cm.

(2) Other three steps slowly came back into the curve, at about the proper rate, according to Rutherford and Soddy's theory of radio-active change. They had heights of about 4 cm., 4·5 cm., and 6·7 cm. respectively.

(3) These three were all nearly equal in width, implying that the number of α particles in each stream was the same, as it should be.

(4) A red heat temporarily removed the first two of these three steps, the third afterwards dying out. It therefore appeared that the third was due to the second radio-active product, the others being due to the first radio-active product and the emanation.

(5) The α particle ionised more successfully towards the end of its career.

The author also showed that in Becquerel's photographic trace of the path of the α ray in a magnetic field there should be—on at least one side of the trace—more curvature in the part of the curve near the radium than in the part further away; and that in this way Becquerel's observations to that effect might be explained. The outer edge was, in fact, the locus of the ends of the rays, not the path of any one ray.

It was more difficult to determine the precise positions of the corners of the polygon in the case of thick layers than the positions of the steps in the curve of thin layers. Experiments on the former, conducted with dome-shaped ionisation chambers of various radii, had met with some degree of success.

Mr. R. Kleeman had given valuable assistance during the research.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia

(Incorporated)

FOR 1903-4.

ORDINARY MEETING, NOVEMBER 3, 1903.

JOSEPH C. VERCO, M.D., F.R.C.S. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., a sprig of *Pinus halipensis* covered with scale (*Chermes*, sp.) insect. This scale is extremely injurious to plant life. Unlike others of the same family, it occupies the extremities of the limbs first, and works downwards, producing top-drying, and ultimately death. Probably introduced from the East. Mr. TEPPER also exhibited a moth (*Doratifera oxleyi*), colour brown, male smaller than female. The caterpillar, before passing into the larval state, spins a very thin cocoon, which it stiffens by discharging into and saturating it with a thick, agglutinative fluid, finally cutting the silk to allow the escape of the matured moth. Mr. S. SMEATON, B.A., had seen this moth in the sugar gums of a brilliant colour; it is not eaten by birds. D. FLEMING, Chairman of the Microscopical Section, exhibited some young fish and eggs taken from the River Torrens.

PAPERS.—The Tate Memorial Medal Prize Essay:—"The Port Victor Granite," by H. W. Gartrell, communicated by W. G. WOOLNOUGH, B.Sc., F.G.S. "Description of Australian *Curculionidæ*, with Notes on Previously Described Species," Part ii., by A. M. LEA, Government Entomologist, Tasmania.

ORDINARY MEETING, DECEMBER 1, 1903.

JOSEPH C. VERCO, M.D., F.R.C.S. (President), in the chair.

PRESENT.—Professor E. H. Rennie, D.Sc. (Vice-President), W. Rutt, C.E. (Hon. Treasurer), Dr. Cleland, W. Howchin, F.G.S. (Editor of the Transactions, etc.), Samuel Dixon, D. Fleming, W. H. Baker, H. Basedow, Miss E. Collison, B.Sc., and the Hon. Secretary.

EXHIBITS.—W. HOWCHIN, F.G.S., the fruit, seed, and leaves of the Leichhardt tree, which had been brought down from beyond Tennant's Creek, Northern Territory, by H. Y. L. Brown, Government Geologist. D. FLEMING, Chairman of the Microscopical Section, exhibited a Polyzoan, from the River Torrens (*Plumelella repens*).

DISPOSAL OF THE LIBRARY.—Professor RENNIE, D.Sc., introduced the proposal to hand over the books and periodicals of the Society to the Board of Governors of the Public Library, etc., for the consideration of the meeting. It was then proposed by Dr. CLELAND, seconded by D. FLEMING, and carried unanimously—"That the Council of the Society be empowered to make arrangements with the Board of Governors of the Public Library, etc., to take over and keep for public use such portions of the Royal Society's Library as may be considered by the Council desirable, and hold under such terms as the Council may determine to be in the best interests of the members of the Society."

NOMINATIONS.—David Gordon, Warehouseman, Adelaide, and Howard Whitbread, Pharmacist, Adelaide, as Fellows.

ORDINARY MEETING, APRIL 7, 1904.

JOSEPH C. VERCO, M.D., F.R.C.S. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., a branch of lemon tree on which was growing a large parasitic plant (*Loranthus exocarpi*). The specimen was collected by Mr. Fergusson, of the School of Mines, from a garden at Mitcham, and shows that this species of *Loranthus* grows on the *Citrus*. Mr. ZIETZ observed that the *Loranthus* readily grows on fruit trees Mr. TEPPER also exhibited a case of insects, collected by Mr. H. Basedow, in the north-west part of South Australia. Some 445 specimens were obtained, and have been presented to the South Australian Museum by the collector. The identification of the *Coleoptera* has been undertaken by the Rev. Thomas Blackburn, B.A.; the *Lepidoptera* by Mr. Oswald B. Lower, F.E.S. (Lond.); whilst the identification of the *Orthoptera* and any other orders there may be in the collection has been undertaken by J. G. O. Tepper, F.L.S.

BALLOT.—David Gordon and Howard Whitbread, both of Adelaide, elected as Fellows.

PAPERS.—"Recent Corals from the South Australian and Victorian Coasts," by JOHN DENNANT, F.G.S. W. HOWCHIN, F.G.S., in bringing this paper before the meeting, remarked:—"Owing to the President's generosity the plates would cost the Society nothing, and that many of the corals described had been dredged by Dr. Verco." Mr. HOWCHIN gave a preliminary and verbal account of the geological discoveries he had made during the late vacation. After illustrating on

the blackboard the general relative positions of the rocks in the Mount Lofty and Flinders Ranges, Mr. Howchin said he had ascertained that the formations, as shown in the section from Marino to Mount Lofty, were found generally in the same order in the Flinders Ranges, as far as examined. The series occupied the same relative position over the whole area. The highest member of the series, the purple slates, which included the archæocyathinæ limestones, occupied a superior position to the older glacial beds. The fossil remains in the limestone gave a datum for the whole formation. Mr. Howchin also described the geological features of Mount Remarkable, and explained how, in all probability, it came to possess so singular an outline. W. G. WOOLNOUGH, D.Sc., remarked that Mr. Howchin's discoveries would form the basis of future geological and mineralogical work. Professor W. H. BRAGG, M.A., then gave an interesting account of his visit to New Zealand on the occasion of the meeting of the Australian Association for the Advancement of Science, held at Dunedin in January last. He mentioned, in the course of his address, that, owing to the meeting of the Medical Congress in Adelaide, in September, 1905, the meeting of the Australian Association for the Advancement of Science had been put off for a year. Professor BRAGG also stated that his nomination of Professor Baldwin Spencer as the President of the meeting in Adelaide was well received, and was peculiarly appropriate, because much of Professor Spencer's work had been done in South Australia.

NOMINATION.—Dr. Reissmann, as a Fellow.

ORDINARY MEETING, MAY 3, 1904.

Dr. CLELAND in the chair.

BALLOT.—C. Reissmann, M.A., M.D. (Cantab.), B.Sc. (Lond.), etc., elected a Fellow.

EXHIBITS.—EDWIN ASHBY gave an interesting account of a visit to the Blackall Ranges, Queensland, and exhibited 46 varieties of birds' skins which he had obtained in that locality; also a case of beautiful butterflies and some large land shells.

ORDINARY MEETING, JUNE 7, 1904.

JOSEPH C. VERCO, M.D., F.R.C.S. (President), in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., a small quantity of monazite, from the Northern Territory. This mineral consists of phosphate of thorium and other rare elements.

BALLOT.—H. Griffith, of Adelaide, was elected a Fellow.

NOMINATIONS.—James Gartrell, William Taylor, and Mrs. H. R. Robinson.

PAPERS.—"Anthropological Observations made on the Government N.W. Expedition (Central Australia)," by H.

BASEDOW. Mr. BASEDOW exhibited a number of sketches of native rock paintings and photographs of groups of natives to illustrate his paper. "Descriptions of Some New Species of Orthoptera, collected during the Government N.W. Expedition (Central Australia)," by J. G. O. TEPPER, F.L.S. Mr. TEPPER exhibited a case of insects, being part of those collected during the expedition. "Descriptions of New Species of Australian *Elachistidæ*, etc.," by OSWALD B. LOWER, F.E.S. (Lond.).

ORDINARY MEETING, JULY 5, 1904.

JOSEPH C. VERCO, M.D., F.R.C.S. (President), in the chair.

BALLOT.—William Taylor, St. Andrews, North Adelaide, and James Gartrell, of Burnside, were elected Fellows, and Mrs. H. R. Robinson, "Las Conchas," Largs Bay, was elected an Associate.

EXHIBITS.—Referring to the mineral monazite, a specimen of which had been exhibited at the last meeting, Mr. Zietz remarked that it was found in New South Wales. W. HOWCHIN, F.G.S., exhibited a large and interesting collection of rock specimens and fossils from Lake Eyre district, together with native weapons and food products.

PAPERS.—"Note on South Australian Decapod Crustacea," Part i., by W. H. BAKER. "Nudibranchiate Mollusca of South Australia," by H. BASEDOW. [This paper was subsequently withdrawn for reconstruction.] "Remarks on a Recent Visit to the Lake Eyre District," by W. HOWCHIN, F.G.S. Mr. HOWCHIN described the physical and geological contrasts in passing from the Cambrian rocks of the Flinders Range to the Cretaceous of the Lake Eyre basin. The desert sandstone country, the sandhills and claypans, the stony (gibber) deserts, and the mound springs were described, and received illustration by numerous exhibits. The most remarkable mound spring met with was one known as the "boiling spring," situated about a quarter of a mile distant from Blanche Cup. It takes its name, not from possessing a high temperature (which is not more than tepid), but from its boiling action, by which the quicksand rolls and twists and rises above the level of the water like a huge serpent. The extinct mound springs are immensely larger than those now active. Mount Hamilton, within a quarter of a mile of Blanche Cup, is one of these, and is sixty feet high and a half-mile in circumference. The mount is composed of compact dolomitic limestone, which was precipitated from the spring when active. Near the centre, on the top of the mount, there is a shallow depression, but no water. An old flint quarry that had been worked by the aboriginals for their stone implements was also described, and an old mulga

stick was shown, which the lecturer had found in the quarry, and had been used by the natives to prise up the flints from their bed. It had evidently been left by the last workers. The hill on which the quarry was situated, and which was covered with countless numbers of chippings, was near Pidleeomina Waterhole, thirty miles south-west from Stuart's Creek Station. Mr. Howchin also exhibited a number of large and roughly made stone implements, stained red, which he had obtained from the table top country. These implements were unlike those now used by the natives or commonly met with on the lower ground and sandhills of the country, and might possibly have belonged to an older race now extinct.

ORDINARY MEETING, AUGUST 2, 1904.

JOSEPH C. VERCO, M.D., F.R.C.S. (President), in the chair.

EXHIBITS.—A. H. C. ZIETZ, F.L.S., Assistant Director of the Museum, exhibited a fungus (*Polyphorus mylittæ*), found about three feet under ground, in wet, sandy soil, near gum trees, at Myponga. This fungus was formerly eaten by the natives. It grows to about the size of a football, and has the appearance of a large potato. It is found in New South Wales and Tasmania, but has not previously been recorded from South Australia. Mr. ZIETZ also exhibited a number of well-known birds from both northern and southern Australia, and two hybrids, one between *Platycercus barnardi* and *P. flaveolous*, from the Wirrabara Forest, and the other between *Geopelia tranquilla* and *G. striata*, bred in captivity.

PAPER.—"South Australian Marine Mollusca," by J. C. VERCO, M.D., F.R.C.S.

ORDINARY MEETING, SEPTEMBER 6, 1904.

JOSEPH C. VERCO, M.D., F.R.C.S. (President), in the chair.

BALLOT.—William Christie, of Adelaide, was elected a Fellow.

EXHIBITS.—O. B. LOWER, F.E.S. (Lond.), a pseudomorph cast of a shell (*natica*), in opal, from White Cliffs. W. HOWCHIN, F.G.S., a number of rock specimens to illustrate his paper.

PAPERS.—"On the Alpha Rays of Radium," by Professor W. H. BRAGG, M.A. "Geology of the Mount Lofty Ranges: Part i., The Coastal District," by W. HOWCHIN, F.G.S.

ANNUAL MEETING, OCTOBER 4, 1904.

J. C. VERCO, M.D., F.R.C.S. (President), in the chair.

The Annual Report and Balance-sheet were adopted

ELECTION OF OFFICERS.—J. C. Verco, M.D., F.R.C.S., as President: Professor E. H. Rennie, D.Sc., F.C.S., and Rev

Thomas Blackburn, B.A., as Vice-Presidents; Walter Rutt, C.E., as Hon. Treasurer.

ELECTION OF MEMBERS OF COUNCIL.—Samuel Dixon and W. H. Selway.

EXHIBITS.—A. H. C. ZIETZ, F.L.S., a large, sound-producing, ground spider, from the Malay Peninsula, and copper ores from Paull's Creek Copper Mine, South Australia. E. ASHBY, bird skins from Woodford, Queensland, *Malurus lamberti* and *M. melanocephalus*, and, for purposes of comparison, *M. assimilis*, from Ardrossan: *Eopsaltria magnirostris*, *Platycercus palidiceps*, and *Hypotnædia Philipinensis*. W. H. SELWAY, a piece of shale with dendritic markings. H. BASEDOW, "ironstone biscuits." The exhibitor stated that during a sojourn at Cape Jervis concretions were found on the surface of the glacial deposits occurring in that neighbourhood. Their shape and external characteristics are similar to the limestone "biscuits" of the "biscuit flats"; but in this case the composition is hydrated oxide of iron. It was suggested that they might be true pseudomorphs of ironstone after limestone. No examples were, however, found showing an intermediate stage of pseudomorphism, so that, if they be true pseudomorphs, the molecular replacement has been effected in so perfect a manner that the specimens, with the exception of their superior hardness, might easily be mistaken for the darker-coloured varieties of the "limestone biscuits." Mr. HOWCHIN stated that discoid and nodular concretions of limonite were commonly found in the upper part of the glacial beds of this age, and, as the physical conditions under which they occurred at Cape Jervis were not the same as those of the "biscuit flats," he would be inclined to regard them as segregations of ironstone in the clay itself, or at the line of junction between the clay and overlying sand rock, as was the case at Queenstown, Kangaroo Island. The specimens exhibited showed sand grains cemented by the hydrated oxide of iron, which seemed to support this view.

PAPERS.—"Description of New Species of Tertiary Corals," by JOHN DENNANT, F.G.S. "Further Notes on the Australian Coleoptera, with Descriptions of New Genera and Species," by Rev. THOMAS BLACKBURN, B.A. "Petrographical Examination of Some South Australian Quartzites, Sandstones, and Related Rocks," by W. G. WOOLNOUGH, D.Sc., F.G.S. "Note on Tertiary Exposures in the Happy Valley District," by HERBERT BASEDOW. "Geological Report on the Government N.W. Prospecting Expedition to Central Australia, 1903" (Tate Memorial Medal Prize Essay), by HERBERT BASEDOW. "New Australian Lepidoptera, with Synonymic and Other Notes," by A. JEFFERIS TURNER, M.D., F.E.S.

ANNUAL REPORT, 1903-4.

The Council has pleasure in reporting that the work of the Society in various departments of original research has been fully maintained during the past year. Among the principal papers received during the year now closing may be mentioned:—"On the Australian Coleoptera," by Rev. Thomas Blackburn, B.A., No. xxxiv. "Australian Curculionidæ," Part ii., by A. M. Lea. "Recent Corals from the South Australian and Victorian Coasts," by John Dennant, F.G.S.; "New Species of Australian Elachistidæ, etc.," by O. B. Lower, F.E.S. (Lond.). In connection with the Government N.W. Expedition to Central Australia, "Anthropological and Geological Observations," by H. Basedow, and "Descriptions of Some New Species of Orthoptera," collected in the same expedition, have been given in a paper by J. G. C. Tepper, F.L.S. "South Australian Decapod Crustaceans," by W. H. Baker; "South Australian Marine Mollusca," by the President (Dr. Verco), and "New Australian Lepidoptera with Synonymic and other Notes," by Dr. A. Jefferis Turner, F.E.S. In connection with the geology of the State, "The Geology of the Mount Lofty Ranges, Part i.," by W. Howchin, F.G.S.; and "Tertiary Exposures in the Happy Valley District," by H. Basedow.

During the year seven members have been elected, and this increase is largely due to the exertions of one of our number (Mr. Ashby), whose example might well be followed by other Fellows and Associates. There are now on the roll 7 corresponding members, 11 honorary members, 62 fellows, and 2 associates.

The Council regrets to have to record the death of John Howard Angas, a member of the Society since 1874.

With the view of rendering the library of the Society more generally available to members and useful to the scientific public, a scheme for transferring it to the Public Library, drawn up by a committee appointed for the purpose, is now under consideration by the Board of Governors.

Owing largely to the amount of valuable matter that has been received during the year, and partly to shrinkage of the annual grant, some little difficulty was at one time anticipated in meeting current expenses, but this has been happily obviated, the Government having placed on the Estimates a special sum which, with the ordinary sources of revenue, will enable the Council to carry on the work of the Society. In

addition to the foregoing means the President (Dr. Verco) has generously undertaken to bear the cost of all plates illustrating papers on the natural history of South Australia in the forthcoming volume.

The Council has the pleasure of reporting that the Malacological, Microscopical, and Field Naturalists' Sections are doing a useful work in their respective departments, the last-named having attained its twenty-first anniversary.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA (INCORPORATED).

Dr.	£	s.	d.	£	s.	d.
October 1st, 1903.						
To Balance				65	3	9
" Subscriptions -						
Royal Society (including £8 3s. 6d. special, from President)	69	16	6			
Field Naturalists' Section	15	0	0			
Malacological Section ...	1	13	0			
Microscopical Section ...	7	12	6			
				94	2	0
" Government grant				73	2	6
" Interest				2	7	8
				£234	15	11

Cr.	£	s.	d.	£	s.	d.
By Transactions—						
Printing	59	0	0			
Illustrating	13	3	6			
Publishing	5	15	8			
				77	19	2
" Grants in aid—						
Field Naturalists' Section	12	0	0			
Malacological Section ...	1	0	0			
Microscopical Section ...	8	0	0			
				21	0	0
" Library—						
Salary of Librarian ...	10	0	0			
Shelving and Sundries ...	6	16	0			
				16	16	0
" Incorporation and New Rules				0	19	0
" Wages—Caretaker				3	0	0
" Printing, Postage, Stationery, etc.				8	12	7
" Advertising				6	12	8
" Exchange on Cheques ...				0	2	0
" Balance in Savings Bank on October 1, 1904				99	14	6
				£234	15	11

WALTER RUTT, Treasurer.

Adelaide, 1st October, 1904.

Audited and found correct,

DAVID FLEMING,
J. S. LLOYD, F.I.A.S.A., } Auditors.

DONATIONS TO THE LIBRARY

FOR YEAR 1903-4.

TRANSACTIONS, JOURNALS, AND REPORTS.

Presented by the respective Editors, Societies, and Governments.

AUSTRIA AND GERMANY.

Berlin—Königl. Preuss Meteor. Instits.—Ver-offentlichungen der Ergebnisse, 1898 Heft. 3; Beobachtungen, 1899-1900. Abhandlungen Band 2, Nos. 3-4. Königl. Preuss Akademie der Wissenschaften Sitzungsberichte, 1903, Nos. 41-53; 1904, Nos. 1-18, 25-40.

——— Gesellschaft für Erdkunde, Zeitschrift, 1903, No. 6.

——— Deutsches Meteorologisches Jahrbuch, 1902, Heft. 2; 1903, Heft. 1.

——— Berliner Gesellschaft für Anthrop., Ethnol., und Urgeschichte, Zeitschrift für Ethnol, 1903, Heft. 2, 3.

Göttingen—Königl. Gesellschaft der Wissenschaften zu Geschäftliche Mittheilungen, 1904, Heft. 1.

——— Math. phys. Klasse, 1903, Heft. 1, 2, 5, 6.

Heidelberg—Land und Forstwirtschaft in Deutschostafrika, Berichte, Band II., Heft. 1-3.

Munich—K.B. Akademie der Wissenschaften zu, 1903, Heft. 3, 4, 5.

Nüremburg—Naturhistorischen gesellschaft zu, Abhandlungen Band 15, Heft. 1.

——— Klasse der, 1903, Heft. 3, 5.

Vienna—K.K. Geologischen Reichsanstalt, Venhandlungen der, 1903, Nos. 12-18; 1904, No. 1.

——— K.K. Naturhistorischen Hofmuseums, Annalen, Band 18, No. 1.

Kaiserliche Akad. Wissenschaften in Wien, Anzeiger Math. Naturwissenschaft, 1903, Nos. 1-27. Sitzung. der Mathematisch-natur, 1903, Nos. 18-27; 1904, Nos. 1-9, 14-18.

——— Kaiserlichen Mineralogischen Gesellschaft Heransgegeben, Band 2, Heft. 2.

Würzburg—Physikalisch-Medicinischen Gesellschaft, zu-Sitzungs-Berichte, 1902, Nos. 1-6; 1903, Nos. 1-8.

Australia and New Zealand.

Adelaide—Department of Mines, Short Review of the Mining Operations in South Australia for Six Months ending June 30, 1904.

——— St. John Ambulance Association, Annual Report, 1902.

Brisbane—Department of Agriculture, Botany Bulletin, 1904, No. 16.

——— Department of Mines, Geol. Report, Maps Nos. 184-9.

Melbourne—Royal Society of Victoria, vol. xvi., part 2; Victorian Naturalist, vol. xx., Nos. 8-12, vol. xxi., Nos. 4 and 6; Victorian Yearbook, 1902, three copies.

——— Victorian Geographical Journal, vols. xx. and xxi.

——— Victoria Department of Mines, Nos. 9, 11, 12, and 13.

——— Victoria Department of Agriculture, vol. ii., parts 5, 6, 8, and 9, 12-18.

——— Australasian Institute of Mining Engineers, vol. ix., part 2.

Geelong—Geelong Naturalist, second series, vol. i., No. 1.

Perth—Geological Survey of Western Australia, Bulletin No. 8-10, and Maps.

——— Department of Mines, Report, 1902.

——— W.A. Natural History Society, Journal No. 1.

——— Department of Agriculture, Journal, September.

Sydney—Forest Flora of New South Wales, vol. ii., parts 6-11.

——— Australian Museum, Records, vol. iv., No. 8; vol. v., Nos. 3-4; Australian Birds, part 4.; Memoirs, vol. iv., parts 6-8.

——— Department of Public Instruction, New South Wales, Meteor. Obs., 1900.

——— Department of Mines, New South Wales, Annual Report, 1903.

——— Department of Mines and Agriculture, Geological Survey, Memoirs Palæontology, No. 11 and Plates; Agricultural Gazette, vol. xiv., part 12; vol. xv., parts 1, 2, 4, 6, 8, 10.

——— Linnæan Society of New South Wales, Proceedings, vol. xxviii., part 2, 3, Nos. 110-111; vol. xxviii., part 4, No. 112: vol. xxix., parts 1 and 2, Nos. 113-114: Abstract of Proceedings, July 29, 1903; March 30, 1904: April 27, 1904: June 29, July 27, 1904.

Wellington—New Zealand Institute, Trans. and Proc., vol xxxvi.

Hobart—Australasian Association for the Advancement of Science, 1902.

Launceston—Department of Mines, Tasmania, Geological Department, September 30, 1903; December 31, 1903.

BELGIUM.

Brussels—Musée Royale d'histoire Naturelle de Belgique, Extrait des Memoires, tome 1, 1903.

——— Société Royale de Botanique de Belgique, Bulletin, tome 40.

——— Jardin Botanique de l'état a Bruxelles, vol. i., fasc. 4.

CANADA.

Halifax—Nova Scotian Institute of Science, Transactions and Proceedings.

Ottawa—Geological Survey Catalogue of Canadian Birds, part 2.

Montreal—Canadian Record of Science, vol. ix., part 2.

ENGLAND, IRELAND, AND SCOTLAND.

London—Royal Society of London, Sleeping Sickness Commission, Reports Nos. 2-4. Proceedings, vol lxxii., Nos. 481, 483, and 484-487; vol. lxxiii., Nos. 488-9, 492, 496.

——— Chemical Society, Journal, vol. lxxxiii.-iv, November, December, and vol. lxxxiii., Supplement and four parts, 1 and 2; vol. lxxxv.-vi., January, February, March, April, May, July, August.

——— Chemical Society, Proceedings, vol. xix., Nos. 270, 271, 274; vol. xx., Nos. 275-279, 282.

——— Entomological Society of London, Transactions, 1903.

——— Royal Microscopical Society, 1903, part 6, 1904, parts 1 to 4.

——— Anglo-Russian, 1904, March, vols. vii.-ix.

——— Linnæan Society of London, List of Members, etc., 1903-4; Proceedings, October, 1903.

Cambridge—University Library, Report of Lib. Synd., 1903.

——— Cambridge Phil. Soc., Proceedings, vol. xii., parts 4-6.

Manchester—Field Naturalists' and Archæologists' Society Report and Proceedings, 1903.

——— Manchester Lit. and Phil. Soc., Memoirs and Proceedings, vol. xlviii., parts 1 and 3.

——— Manchester Geological Society, Transactions, vol. xxviii., parts 8, 9, 10, and 12.

Leeds—Journal of Conchology, vol. xi., parts 1, 2, 3.

Liverpool—Biological Society, Proceedings and Transactions, vol. xvii.

Belfast—Natural History and Philosophical Society, Report and Proceedings, 1902-3.

Dublin—Royal Dublin Society, Economic Proceedings, vol. i., part 4; Scientific Proceedings, vol. x., part 1; Scientific Transactions, vol. lxxx., parts 2-5.

——— Royal Irish Academy, Proceedings, vol. xxiv., section A, parts 3 and 4, and sections B and C.

FRANCE.

Caen—Société Linéene de Normandie, Bulletin, Series 5 and 6.

Paris—Société Entomologique de France, Bulletin, 1903, Nos. 15-21; 1904, Nos. 1, 2, 5, 6, and 9-12.

——— Feuille des Jeunes Naturalistes, Nos. 397-404, and 407.

Rennes—Université de Rennes, Travaux Sc. del, tome 3, fasc. 1, 2.

Nantes—Société des Sciences Naturelles de l'Ouest de la France, Bulletin de la, 2e sér, tome 3, 1er 2e tri.

ITALY.

Florence—Società Entomologica Italiana, Bulletino, 35 tri, 1-4.

Milan—Società Italiana de Scienze, Naturali e del Museo Cevico di Storia Naturalo in Milano, vol. xlii., fasc. 3, fogli. 6, fasc. 4 fogli. 7¼; vol. xliii., fasc. 1/6 and fasc. 2 fo. 6¼.

Pisa—Società Toscana di Scienze Naturali, Atti della Processi Verbali, vol. xiii., 5; vol. xiv., 1, 2.

INDIA.

Calcutta—Indian Museum, Annual Report, 1902-3.

——— Board of Scientific Advice, Annual Report, 1902-3.

JAPAN.

Kyóto—Imperial University Calendar, 1903-4.

Tokyo—Seismological Society, Earthquake Inves. Com. Pubs. No. 16.

——— Imperial University of Tokyo, Journal, vol. xvii., art. 12; vol. xviii., art. 4-7; vol. xix., art. 2, 8, 10, 11-20.

——— Asiatic Society, vol. xxxi.

MEXICO.

Mexico—Instituto Geologico de México-Parergones, to. 1, num. 1 and 2.

NORWAY AND SWEDEN.

Stockholm—Geologiska Föreningens Förhandlingar Tingotredje, Bandet, 1903, 25.
——— Entomologiske Tidskrift, arg. 24, heft. 1-4.
——— Kongelige Norske Videnskabers Selskabs Skrifter, 1902.
——— Kongel, Vitterhets Historie och Antiquitets Manadsblad Akademiens, 1898-9, 1901-2.
Bergens—Bergens Museum, Aarsberetning, 1902, Aarbog, 1902, 1903, hefte 2, 3.

RUSSIA.

St. Petersburg—Société Imperiale Mineralogique Verhandlungen, band. 41.
——— Comité Géologique, Bulletins, 1902, vol. xxi., Nos. 5-10; Memoirs, vol. xvi., No. 2, vol. xvii., No. 3; vol. xx., No. 1.
Moscow—Société Impériale des Naturalistes de Moscou, Bulletin, 1903, 2 and 3.

SWITZERLAND.

Geneva—Société de Physique et de Histoire Naturelle Compte rendu des Seances, 1903, 20.
Zurich—Naturforschenden Gesellschaft in Zurich Vierteljahrschaft, June, 1901: March, July, 1902; 1902, heft. 3, 4.
Lausanne—Société Vaudoise des Sciences Naturelles Bulletin, vol. xl., 149.

SANDWICH ISLANDS.

Honolulu—Fauna Hawaiiensis, vol. i., part 4; vol. iii., part 4.
——— The Bernice Pauahi Bishop Museum, Occasional Papers, vol. ii., Nos. 1 and 2.

SOUTH AND CENTRAL AMERICA.

Buenos Ayres—Academia Nacional de Ciencias en Cordoba, Boletin, tomo xvii., entrega 3a.
Peru—Cuerpo de Ingenieros de Minas del Peru, Boletin, Nos. 3, 6, 7, 9.
Monte Video—Museo Nacional Anales, tomo v., entrega 1-160; ser. 2, entrega 1.

SOUTH AFRICA.

Cape Town—South African Museum, Annals, vol. iii., part 4, 5; vol. iv., parts 1-5.
——— South African Association for the Advancement of Science, Report, 1903.
——— Albany Museum, Records, vol. i., part 2.

UNITED STATES OF AMERICA.

Boston—American Academy of Arts and Sciences, vol. xxxviii., No. 36; vol. xxxix., Nos. 1-4, 22-23.

Chicago—Field Columbian Museum, Zoological Series, vol. iii., Nos. 10, 11.

——— Field Columbian Museum, Geological Series, vol. ii., No. 1.

Champaign—Illinois State Laboratory of Natural History Bulletin, vol. vi., art. 2.

Cambridge—Museum of Comparative Zoology, Bulletins, vol. xl., No. 7; vol. xliii., Nos. 1, 2, 3; vol. xxxix., No. 9; vol. xli., No. 2; vol. xlv., Nos. 1, 2; vol. xlvi., No. 1.

——— Museum of Comparative Zoology, Harvard College, Bulletin, Geol. Series, vol. vi., part 5.

New York—Public Library, Bulletin, vol. vii., Nos. 10-12; vol. viii., Nos. 1, 2, 3, 4, 6, 8.

——— American Museum Journal, vol. iv., No. 3, and Supplement.

Oberlin—Wilson Bulletin, O.S., 15; Nos. 43, 45, 46.

Philadelphia—American Philosophical Society, Proceedings, vol. xlii., 1903.

Washington—United States Geological Survey, Department of the Interior, Water Supply and Irrigation Papers, Nos. 65-79.

——— Department of Agriculture Yearbook, 1903.

——— Washington Academy of Sciences, Proceedings, No. 5, pp. 231-429.

——— Smithsonian Institution, Proceedings of the United States Natural History Museum, vol. 26.

LIST OF FELLOWS, MEMBERS,

ETC.,

OCTOBER, 1904.

Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any change in the address should be notified to the Secretary.

Date of Election.

Honorary Fellows.

1893. *Cossman, M., Rue de Maubeuge,, 95, Paris.
1897. *David, T. W. Edgeworth, B.A., F.R.S., F.G.S., Prof. Geol., Sydney University.
1888. *Dennant, John. F.G.S., F.C.S., Inspector of Schools, Camberwell, Victoria.
1876. Ellery, R. L. J., F.R.S., F.R.A.S., Gov. Astron., the Observatory, Melbourne, Victoria.
1890. *Etheridge, Robert, Director of the Australian Museum of New South Wales, Sydney.
1893. Gregorio, Marquis de, Palermo, Sicily.
1855. Hull, H. M., Hobart, Tasmania.
1892. *Maiden, J. H., F.L.S., F.C.S., Director Botanic Gardens, Sydney, New South Wales.
1898. *Meyrick, E. T., B.A., Elmswood, Marlborough, Wilts, England.
1876. Russell, H. C., B.A., F.R.S., F.R.A.S., Gov. Astron., Sydney, New South Wales
1894. *Wilson, J. T., M.D., Prof. of Anatomy, Sydney University.

Corresponding Members.

1881. Bailey, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *Cloud, T. C., F.C.S., Manager Wallaroo Smelting Works, S.A.
1880. *Foelsche, Paul, Inspector of Police, Palmerston, N.T.
1893. *McKillop, Rev. David, Daly River Mission, N.T.
1886. Nicolay, Rev. C. G., Fremantle, W.A.
1883. *Stirling, James, Gov. Geologist, Victoria.
1893. Stretton, W. G., Palmerston, N.T.

Fellows.

1895. *Ashby, Edwin, Royal Exchange, Adelaide.
1902. *Baker, W. H., Glen Osmond road, Parkside.
1887. *Blackburn, Rev. Thomas, B.A., Woodville.
1886. *Bragg, W. H., M.A., Prof. of Mathematics, University of Adelaide, S.A.
1883. *Brown, H. Y. L., F.G.S., Gov. Geologist, Adelaide, S.A.
1882. Browne, L. G., Davenport Chambers, Currie street, Adelaide, S.A.

1893. BRUMMITT, ROBERT, M.R.C.S., Gilberton.
1901. *BASEDOW, HERBERT, Kent Town.
1899. BROWNE, T. L., Marlborough Chambers, Adelaide, S.A.
1879. *CLELAND, W. L., M.B., Ch.M., J.P., Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer in Materia Medica, University of Adelaide.
1895. CLELAND, JOHN B., M.D., Ch.B., London, England.
1876. (L) COOKE, EBENEZER, Commissioner of Audit, Adelaide.
1904. CHRISTIE, WILLIAM, Adelaide.
1887. *DIXON, SAMUEL, Bath street, New Glenelg.
1902. EDQUIST, A. G., Hindmarsh.
1886. FLEMING, DAVID, 24, Buxton street, North Adelaide.
1880. *GOYDER, GEORGE, A.M., F.C.S., Analyst and Assayer, Adelaide.
1896. GREENWAY, THOS. J., Chillagoe, Queensland.
1904. GORDON, DAVID, Gawler place, Adelaide.
1904. GRIFFITH, H., Hurtle square, Adelaide.
1904. GARTRELL, JAS., Burnside.
1896. HAWKER, E. W., F.C.S., Adelaide.
1899. *HIGGIN, A. J., Assistant Lecturer on Chemistry, University of Adelaide.
1891. *HOLTZE, MAURICE, F.L.S. Director Botanic Gardens, Adelaide.
1883. *HOWCHIN, WALTER, F.G.S., Lecturer on Geology and Palæontology in the University, Adelaide.
1902. ILIFFE, JAS. DRINKWATER, B.Sc., Prince Alfred College, Kent Town.
1893. JAMES, THOMAS, M.R.C.S., Moonta, South Australia.
1900. *JOHNCOCK, CHAS. F., Morphett Vale.
1902. JEFFREYS, GEO., School of Mines, Adelaide.
1898. *KOCH, MAX, Port Pirie.
1899. KLEEMAN, RICHARD, University, Adelaide.
1884. LENDON, A. A., M.D. (Lond.), M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine, University, and Hon. Physician, Children's Hospital, North terrace, Adelaide.
1856. *LLOYD, J. S., Alma Chambers, Adelaide.
1897. *LEA, A. M., Gov. Entomologist, Hobart, Tasmania.
1888. *LOWER, OSWALD B., Broken Hill, New South Wales.
1874. MAYO, GEO. G., C.E., Tatham street, Adelaide.
1897. *MORGAN, A. M., M.B., Ch.B., Angas street, Adelaide.
1884. MUNTON, H. S., North terrace, Adelaide.
1859. (L) MURRAY, DAVID, Adelaide.
1883. PHILLIPPS, W. H., Adelaide.
1886. POOLE, W. B., Savings Bank, Adelaide.
1885. *RENNIE, EDWARD H., M.A., D Sc. (Lond.), F.C.S., Professor of Chemistry, University of Adelaide.
1869. *RUTT, WALTER, Chief Assistant Engineer, Adelaide.
1904. REISSMANN, CHARLES, M.A., M.D. (Cantab.), B.Sc. (Lond.), etc., College Town, Adelaide.
1891. SELWAY, W. H., Treasury, Adelaide.
1893. SIMSON, AUGUSTUS, Launceston, Tasmania.
1857. *SMEATON, THOMAS D., Blakiston, S.A.
1900. SMEATON, STIRLING, B.A., C.E., Engineer-in-Chief's Office, Adelaide.
1871. SMITH, ROBERT BARR, Adelaide.
1881. *STIRLING, EDWARD C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Professor of Physiology, University of Adelaide, Director of S.A. Museum.

1886. *Tepper, J. G. O., F.L.S., Entomologist, S.A. Museum.
1897. *Torr, W. G., LL.D., M.A., B.C.L., Brighton.
1894. *Turner, A. Jefferis, M.D., Brisbane, Queensland.
1904. Taylor, William, St. Andrews, North Adelaide.
1889. Vardon, Hon. Joseph, M.L.C., J.P., Commissioner of Public Works.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics, University of Adelaide.
1902. Vandenbergh, W. J., Barrister and Solicitor, J.P., Pirie street, Adelaide.
1883. Wainwright, E. H., B.Sc. (Lond.), St. Peter's College, Hackney, Adelaide.
1878. Ware, W. L., J.P., Adelaide.
1859. Way, Right Hon. Sir Samuel James, Bart., D.C.L., Chief Justice and Lieutenant-Governor of South Australia, Adelaide.
1902. *Woolnough, Walter George, D.Sc., F.G.S., Lecturer on Mineralogy and Petrology, University of Adelaide.
1904. Whitbread, Howard, Currie street, Adelaide.
1886. Zietz, A. H. C., F.L.S., C.M.Z.S., Assistant Director, South Australian Museum, Adelaide.

Associates.

1901. Collison, Edith, B.Sc., Medindie.
1904. Robinson, Mrs. H. R., "Las Conchas," Largs Bay, South Australia.

APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

TWENTY-FIRST ANNUAL REPORT OF THE COMMITTEE.

FOR THE YEAR ENDING SEPTEMBER 30, 1904.

Before dealing with the salient features of the work of the past year it is fitting to call attention to the fact that this is the Committee's twenty-first report, and that the Section, therefore, after allowing for the alteration in the month in which the annual meeting was originally held, viz., from October to September, has practically attained its majority. The celebration of this event will take the form of a conversazione, to be held next month, when it is intended to review the history of the Section. Any detailed allusion to this event will, therefore, not appear until the report for the forthcoming year is presented in due course.

EVENING MEETINGS.

During the year eight evening meetings have been held, at which the following papers have been presented:—

October 20, 1903—"Plants and Their Enemies," S. SMEATON, B.A.

November 17, 1903—"Insect Life," H. H. D. GRIFFITH.

April 19, 1904—Boys' Field Club Easter Encampment, Murray Bridge, W. G. WOOLNOUGH, D.Sc., and S. SMEATON, B.A.

May 17, 1904—"Natural History Notes from the South-East," J. AITKEN.

May 17, 1904—"Notes of a Trip over the Great Dividing Range, Victoria," W. H. SELWAY.

June 21, 1904—"Notes of a Visit to the Eastern States," Mrs. J. F. MELLOR.

July 19, 1904—"Some Glimpses of the Plan of Nature," Dr J. W. HENDERSON.

August 16, 1904—"Difference in Size and Plumage of Birds in North and South Parts of Australia," A. H. ZIETZ, F.L.S.

August 16, 1904—"Notes on the Adaptation of Foliage to its Environment," S. SMEATON, B.A.

September 20, 1904—Annual Meeting, Chairman's Address, "Animal Instinct or Reason," E. H. LOCK, F.R.H.S.

It will be seen from this list that there has been considerable diversity in the subjects brought before the members. Two of the papers dealt with the natural history features of the eastern States. While botany has, perhaps, been the most favoured subject, entomology and ornithology are also represented. The last-named department has not received much attention since the establishment of the Ornithological Association here, but the hope may be expressed that while to that body may fitly be left the work of the specialist in that subject, the bird-loving members of our Section will occasionally give us in a more general way the benefit of their observations in that interesting realm of natural history. We have gone outside the ranks of our own members for only one paper during the year, that by Dr. J. W. Henderson, most of whose thoughtful and stimulating address on "Some Glimpses of the Plan of Nature" was printed in the columns of the daily press.

The exhibits have proved an interesting feature of the evening meetings, and during the year minerals, plants, insects, birds, and many other specimens have been shown. Amongst the exhibits were the lichen *Sticta stipitata*, from Pewsey Vale, the largest lichen in South Australia, and probably not previously recorded for this State; the fruit of *Marsdenia Leichardtiana*, from Central Australia: the orchid *Microtis atrata*, from Square Waterhole: a trapdoor spider's nest, from Western Australia, remarkable for having a window in the centre of the door: opals, from White Cliffs; brown coal, from Lake Phillipson bore: the flower of the plant *Choretrum glomeratum*, from Victor Harbour district; an aboriginal axe-head made of diorite: the fruit of the camphor tree; and ground-bees' cocoons, made of segments of green leaves—an occurrence seemingly not previously noted.

EXCURSIONS.

The following is a list of the twelve excursions held during the year:—

October 3, 1903—Happy Valley (via Tapley's Hill, returning via Coromandel Valley).

October 17, 1903—Grenville Glen, near Crafers.

November 7-9, 1903 (three days)—Maclaren Vale, Square Waterhole, Clarendon, etc.
December 12, 1903—National Park.
January 23, 1904—Dredging, Port River.
April 23, 1904—"Las Conchas," Largs Bay, Mrs. H. R. Robertson's collection of shells.
May 21, 1904—Stonyfell.
June 18, 1904—Blackwood.
July 16, 1904—Black Hill.
August 20, 1904—Brownhill Creek (northern branch).
September 1, 1904 (whole day)—Mount George, near Bridgewater.
September 17, 1904—Anstey's Hill, to Teatree Gully.

Of these excursions ten have been half-day outings, one a whole-day, and one a three-days' trip. The three days' excursion (November, 1903) was taken south from Adelaide, Maclaren Vale being the headquarters. This afforded an opportunity of visiting the Square Waterhole district, one of our best localities for native flowers. There we collected many plants not to be found nearer the city. Through the kindness of local friends this lengthy excursion was rendered particularly pleasurable in a social sense, while the route traversed embraced some of our finest hills scenery.

The whole-day trip to Mount George, on September 1, was a pleasant outing, but not very successful botanically, perhaps being too early in the season. This place had not been visited by the Section since January, 1884. It is somewhat difficult at this stage of the Section's existence to find suitable new localities for Saturday afternoon excursions, but during the year two fresh places have been visited, viz., Grenville Glen, near Crafers (when the party were the guests of Mr. and Mrs. G. J. Ireland), and Brownhill Creek (northern branch). By way of experiment the hills at Blackwood were visited earlier (June 18) than hitherto, and this district again gave evidence of its wealth of native flora, especially in orchids. In further proof of this may be mentioned the fact that at an excursion of the Boys' Field Club to this locality later in the season (September 10) no fewer than twenty species of orchids were collected. At Happy Valley, on October 3, 1903, ten species of orchids were gathered.

As a change from botanical investigations, one dredging trip has been held, and, through the kindness of Mrs. H. R. Robertson, an excursion to see her fine conchological collection at "Las Conchas," Largs Bay," was arranged. Further variety was added by a visit to the Olive Company's plantations at Stonyfell, and the Stonyfell Wine Company's cellars, when the processes of oil and wine manufacture were

explained to the members through the courtesy of the officers of these Companies.

The 1903 season's excursions were terminated by a picnic to National Park on December 12. The Section takes a peculiar interest in this Park, owing to the labours of some of its members in getting it vested in trustees as the people's heritage, and would like to see more done in the direction of protecting its native flora, as well as establishing our native fauna among its picturesque hills and dales.

The average attendance at the evening meetings has been greater than for several years past, while the excursions have also maintained their popularity.

A separate report from the Native Fauna and Flora Protection Committee is presented herewith, and contains, *inter alia*, references to the protection of birds in the Northern Territory, the omission of pelicans from the Fisheries Bill, and the suggested establishment of our native mammals in the National Park.

Resignation of Chairman, etc.

In April, 1904, owing to his departure for Europe, we lost the services of our Chairman for the current year (Dr. E. Angas Johnson), the balance of whose term of office has been filled by Mr. E. H. Lock. Dr. Johnson has been elected a Corresponding Member. We also regretted to receive the resignation of Mrs. S. L. Schourup, who was connected with the Section for many years, was most regular in her attendance, and also occupied a position on the Committee for some years prior to and until her retirement.

The Committee in November, 1903, purchased a dredge in place of the one lost in the Port River, and it has already been used with satisfactory results on our sea trips.

Financial.

The receipts from subscriptions have been £15, which, as usual, is paid to the Royal Society, and the expenditure £13 2s. 6d., so that we have again been self-supporting, not taking into consideration the Government subsidy which the parent Society gets on our subscriptions.

Membership.

Fresh names continue to be added to our roll, mostly those of ladies. The additions have been nine, and the withdrawals seven, leaving the membership now seventy-six.

E. H. Lock, Acting Chairman.
W. H. Selway, Hon. Secretary.

Adelaide, September 19, 1904.

SIXTEENTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The last report of your Committee referred to the proposed steps to be taken for obtaining some much-desired alteration in the Birds' Protection Act, a Bill for the amendment of which had been introduced by Mr. Herbert, M.P. That gentleman, however, was afraid that the Committee's amendments might interfere with the passing of his Bill, which was intended to apply chiefly to the Northern Territory, and it was decided to await a more favourable opportunity for action in the matter. The Bill was assented to on October 30, 1903, and gave power to alter by proclamation the close season for birds in the whole, or in any portion of the State; provided for the licensing of bird catchers in the Northern Territory; and made illegal the use of guns of a larger bore than No. 8 or of a greater weight than 15 lb. Up to the present time no proclamation has been made, but the necessary action for bringing the Act into operation will shortly be taken by the Government.

During the last session of Parliament a Bill for the better protection of fisheries was brought in, which provided, among other things, for the payment of capitation fees for the destruction of pelicans, cormorants, and turtles. Some members of the Committee strongly urged upon the gentleman under whose direction the Bill had been drawn the desirability of omitting the pelicans from the ban thus placed upon them, pointing out that their numbers had already been enormously reduced without any apparent benefit, and protesting against any attempt to exterminate these magnificent birds. The Bill was not passed last session, but has again been introduced, and your Committee are pleased to learn that, in deference to their representations and to those of a well-known Victorian ornithologist, who was consulted, the pelicans are not mentioned in the new Bill.

The Hon. Mr. Pascoe last week introduced a Bill for amending the Game Act, the object of which—to provide a close season for opossums—is much to be commended.

The Committee regret that so far the Commissioners of the National Park have not been able to carry out one of the chief objects the Committee had in view when they obtained the grant of the Park, namely, the establishment of a breeding-ground for some of our native mammals. They sincerely hope the Commissioners will take this important matter into their immediate consideration, and that a sufficiently large area of the land may be securely enclosed for the purpose.

SAML. DIXON, Chairman.
M. SYMONDS CLARK, Hon. Secretary.

Adelaide, September 19, 1904.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Payments for the Year 1903-4.

Dr. Receipts.	£.	s.	d.	Payments.	£	s.	d.	Cr. £	s.	d.
To Balance brought forward	4	5	5	By Postages and Sundries	4	12	6			
" Subscriptions	15	0	0	" Printing	5	1	6			
" Grant from Royal Society	12	0	0	" Dredge	1	5	0			
				" Advertising	1	3	6			
				" Attendance	1	0	0			
								13	2	6
				" Subscriptions, as per contra, handed over to Royal Society				15	0	0
				" Balance in hand				3	2	11
	£31	5	5					£31	5	5

Audited and found correct.

J. S. Lloyd, Walter D. Reed, } Auditors.

Adelaide, September 19, 1904.

W. H. Selway, Hon. Secretary and Treasurer.

MALACOLOGICAL SECTION.

ANNUAL REPORT FOR 1903-4.

The Section begs to report that nine meetings have been held during the year, and steady progress has been made in the revision of the census of South Australian mollusca. The list of lamellibranchiata was completed at the beginning of the financial year, and, omitting the polyplacophera, the Section continued to follow the order of classification as given by Zittel. The scaphopoda were dealt with, and of the gastropoda the following families: patellidæ, haliotidæ, pleurotomariidæ, fissurellidæ stomatellidæ, turbinidæ, phasianellidæ, delphinulidæ, and part of the trochidæ.

JOS. C. VERCO, Chairman.

ROBT. J. M. CLUCAS, Hon. Secretary.

October 3, 1904.

MALACOLOGICAL SECTION OF THE ROYAL SOCIETY.

STATEMENT OF ACCOUNTS.

Receipts.

	£	s.	d.
In hand from 1902-03	0	13	0
To Subscriptions	1	17	6
	£2	10	6

Expenditure.

	£	s.	d.
By Postages	0	6	9
" Paid over to Treasurer of the Royal Society	1	17	6
" Balance in hand	0	6	3
	£2	10	6

MICROSCOPICAL SECTION.

ANNUAL REPORT FOR 1903-4.

This Section was re-established on September 17, 1903, and the following officers elected:—Chairman, D. Fleming; Committee, W. B. Poole, W. Fuller, and D. Gordon; Hon. Secretary, E. J. Bradley, Dover street, Malvern. At the evening meetings the following papers were read:—"The Life History of the Grain Rusts," by W. B. Poole; "Modern Methods Employed in Killing and Preserving Organisms for Microscopical Examination," by W. Fuller; "Life History of Fresh Water Polyzoa," by W. B. Poole; "The Study of Potable Water as Stored in Large Reservoirs," by E. J. Bradley. In addition to the above, an evening was spent in the physiological laboratory of the University, by invitation of Professor Stirling, to see the general microscopic methods used in that department, and another evening was devoted to a photo-micrographic and lantern exhibition, given by W. B. Poole and W. P. Dollman. Five evenings were utilised for microscopical exhibits, and field excursions were made to the following places:—Blackwood, Fulham, Torrens Lake; dredging excursion in Port River, Semaphore Jetty, and a second visit to Blackwood. Members on the roll, 34.

MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

BALANCE SHEET, SESSION 1903-4.

Receipts.

	£	s.	d.
Royal Society Grants	8	0	0
Subscriptions	7	12	6
	£15	12	6

Expenditure.

	£	s.	d.
Postage	2	10	4
Advertising and Printing	1	11	0
Stationery	0	3	0
Kerosine and Limelight Lantern	0	9	1
Subscriptions paid to Treasurer of Royal Society	7	12	6
Stamps—Duty on Receipts	0	0	2
Caretakers—Grants to	1	10	0
Balance in hand	1	16	5
	£15	12	6

EDGAR J. BRADLEY, Hon. Secretary.

Audited and found correct.
THEO. GODLEE, Auditor.

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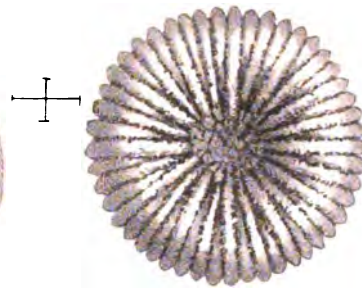

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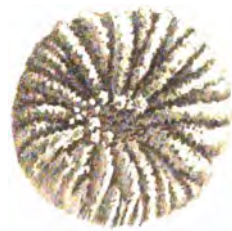

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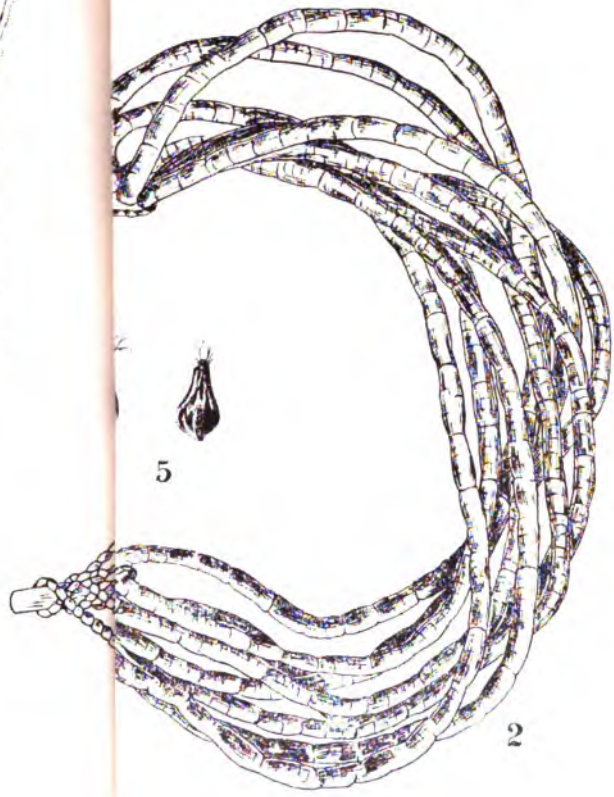

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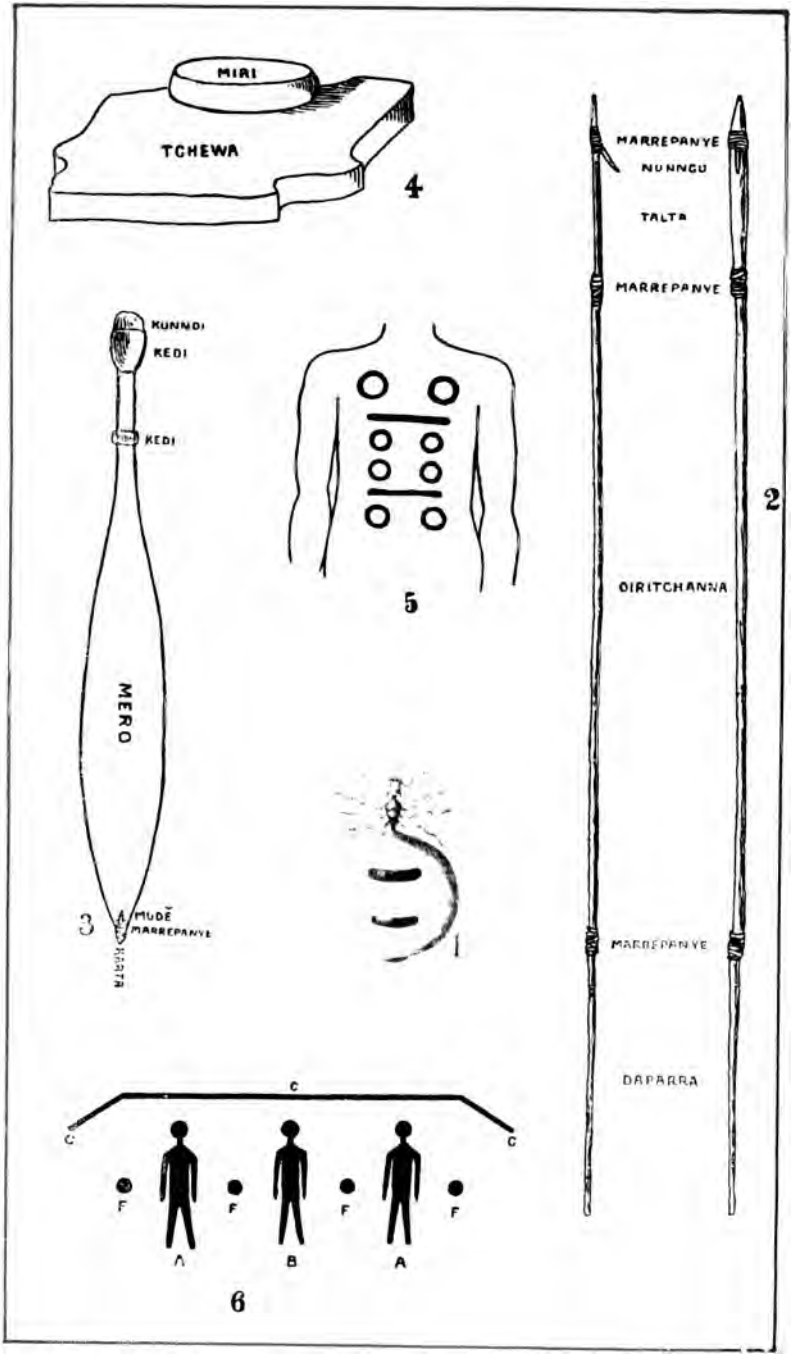
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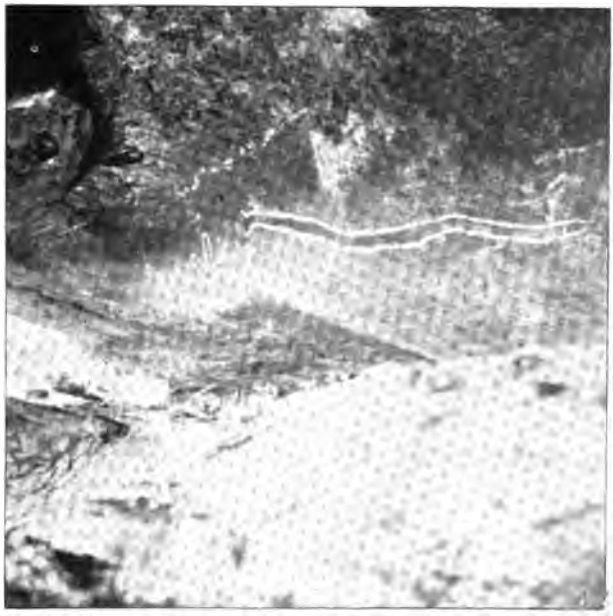

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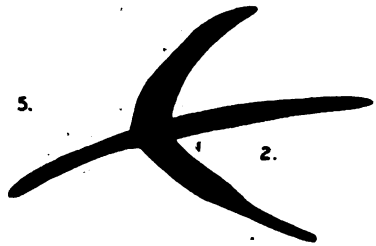
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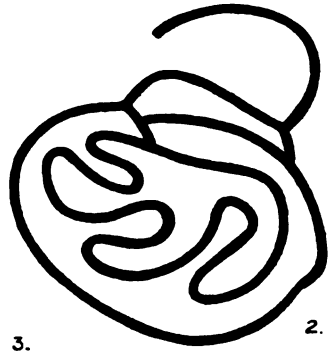

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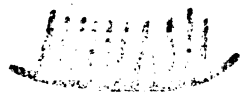

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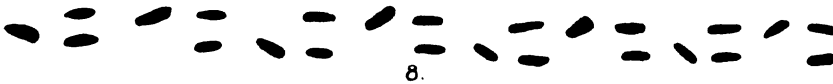

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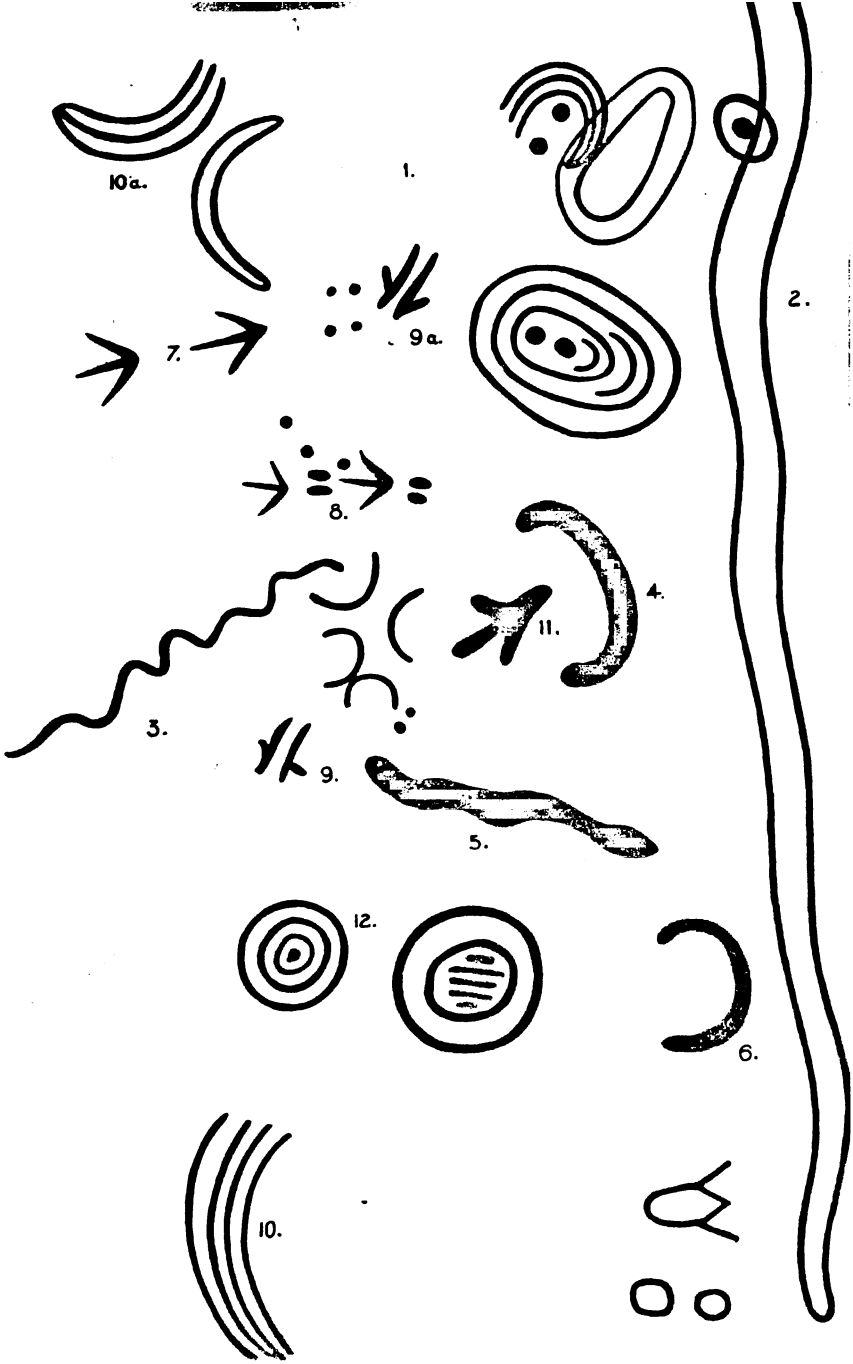
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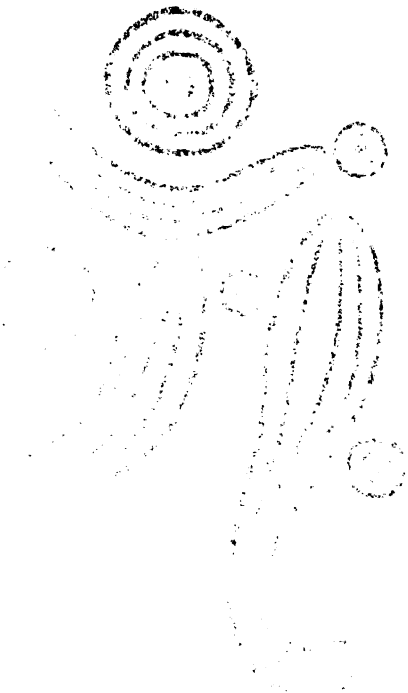

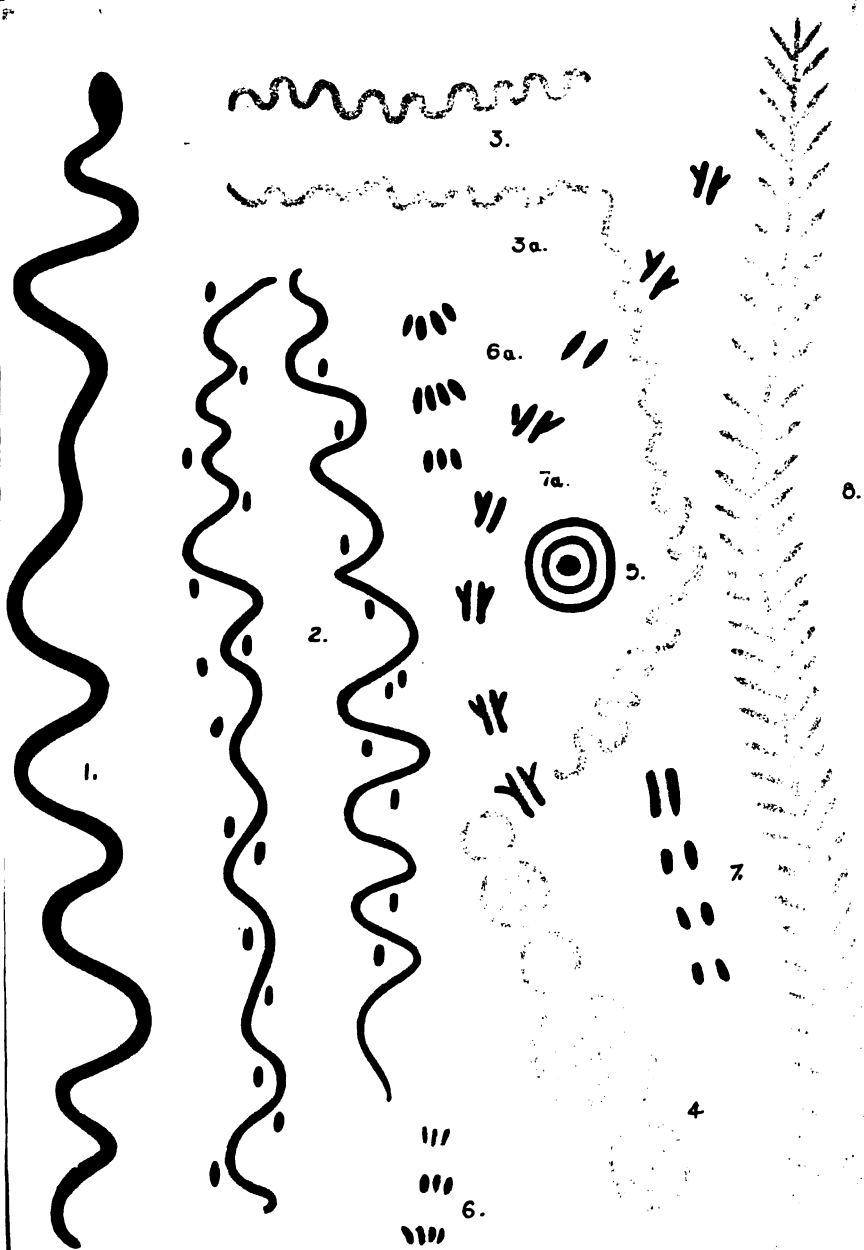
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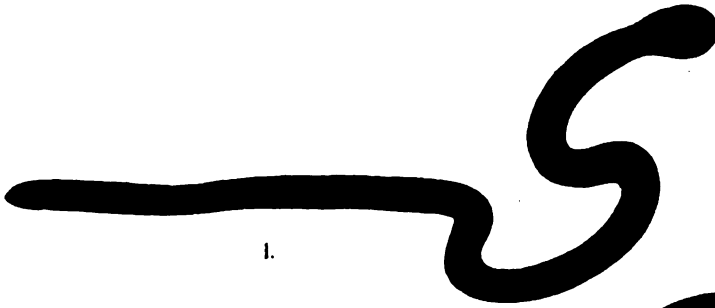

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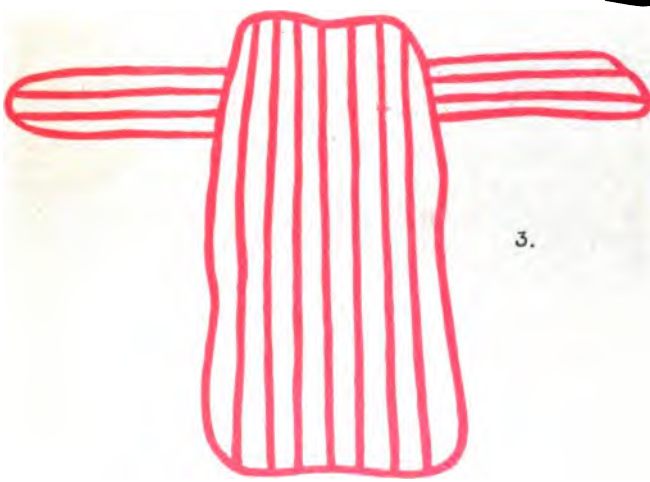

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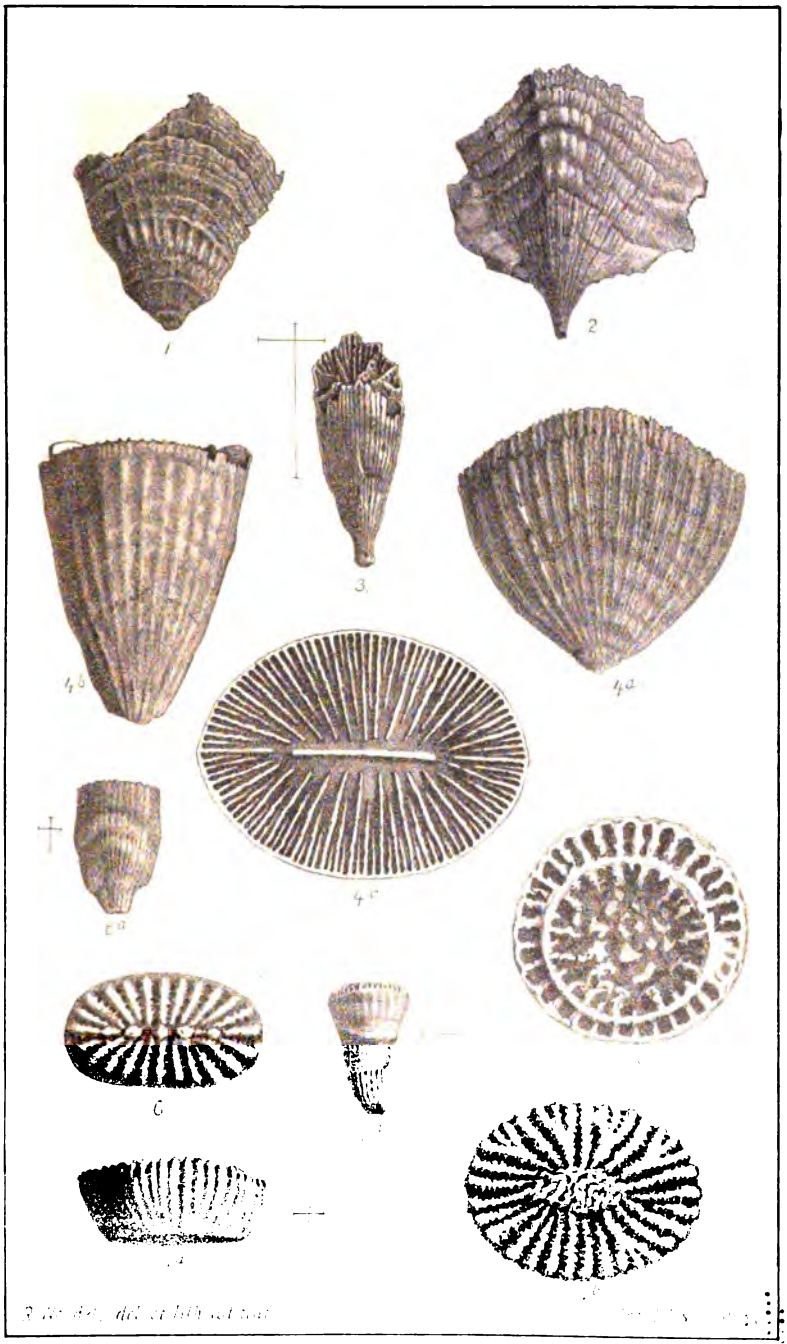
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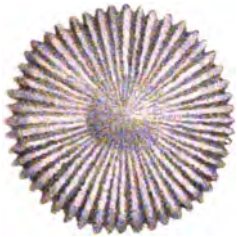

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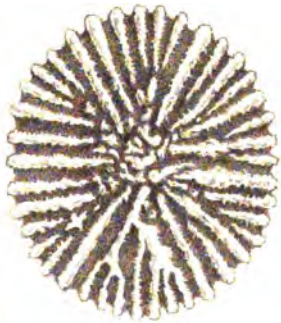

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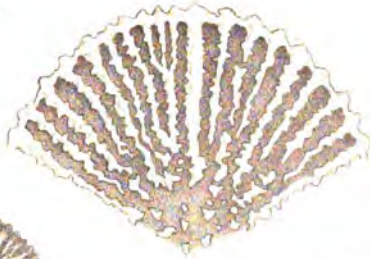

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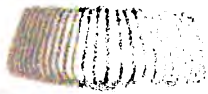

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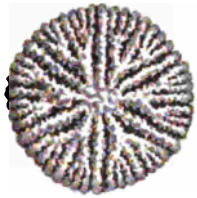
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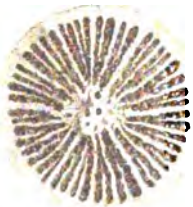
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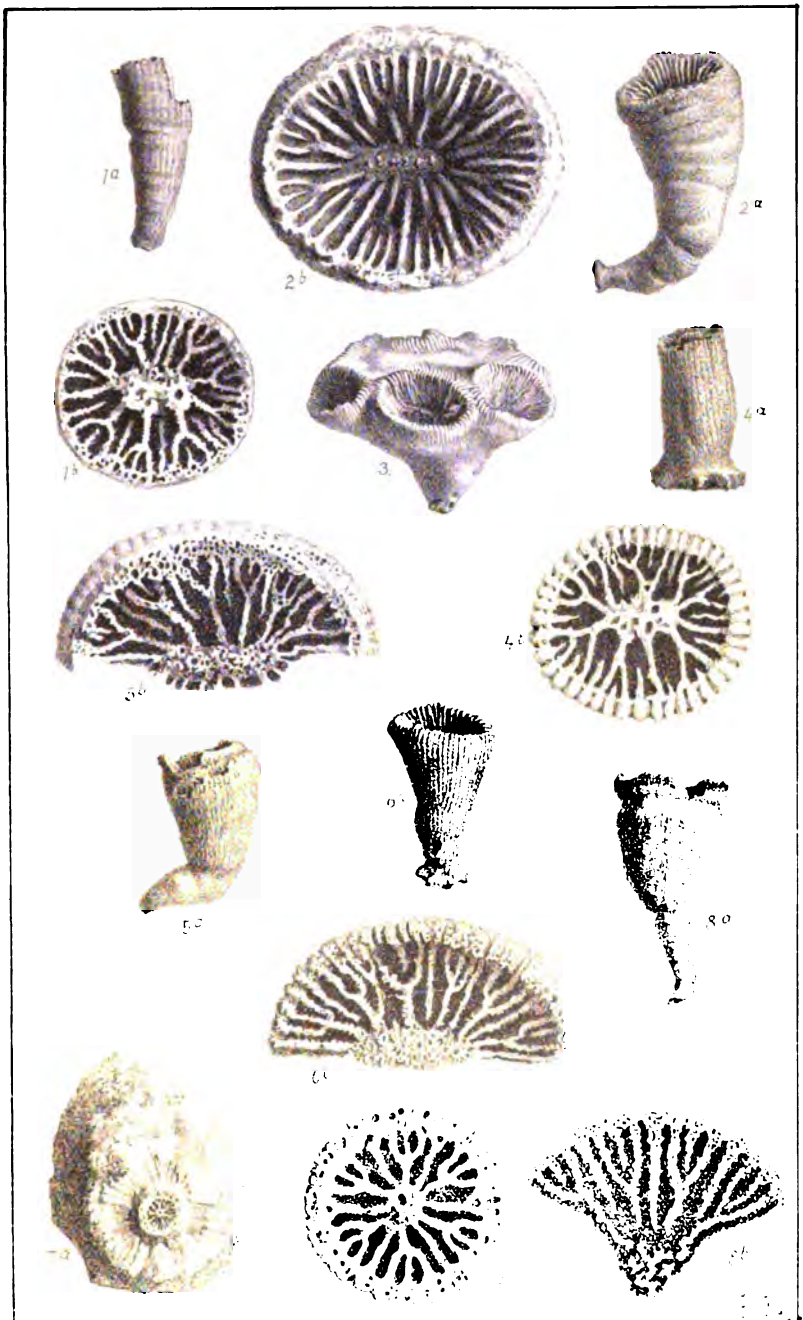
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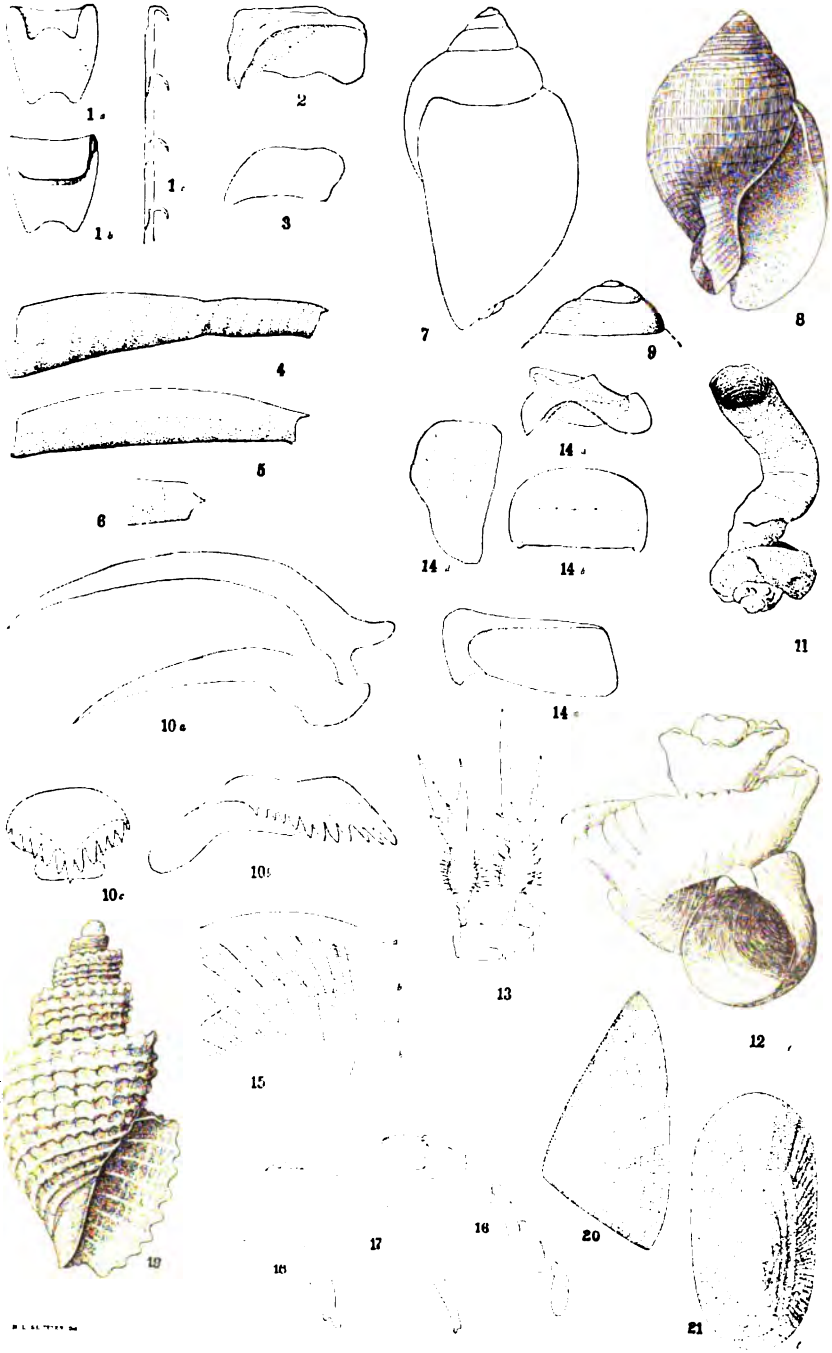
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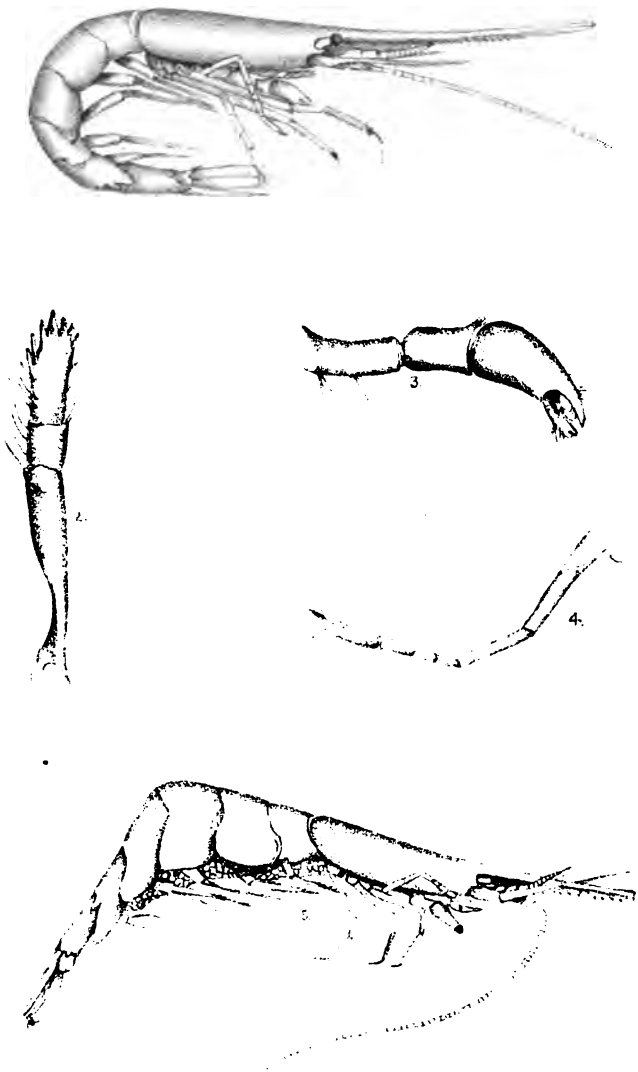

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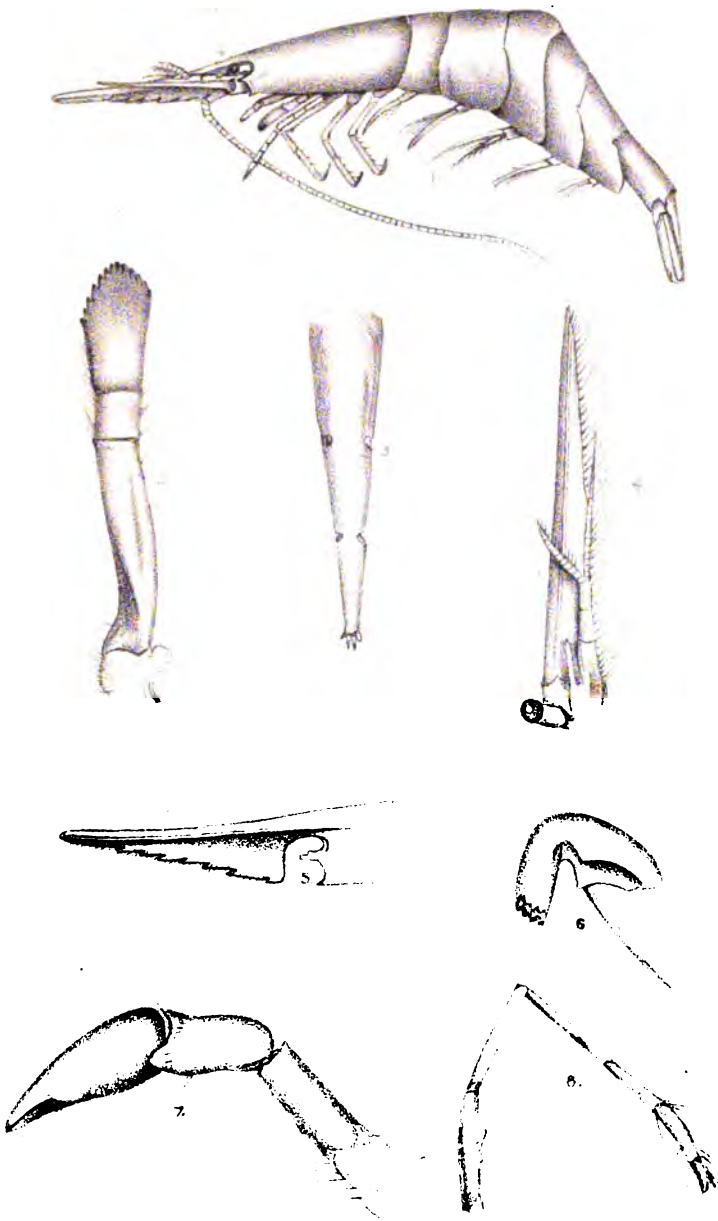

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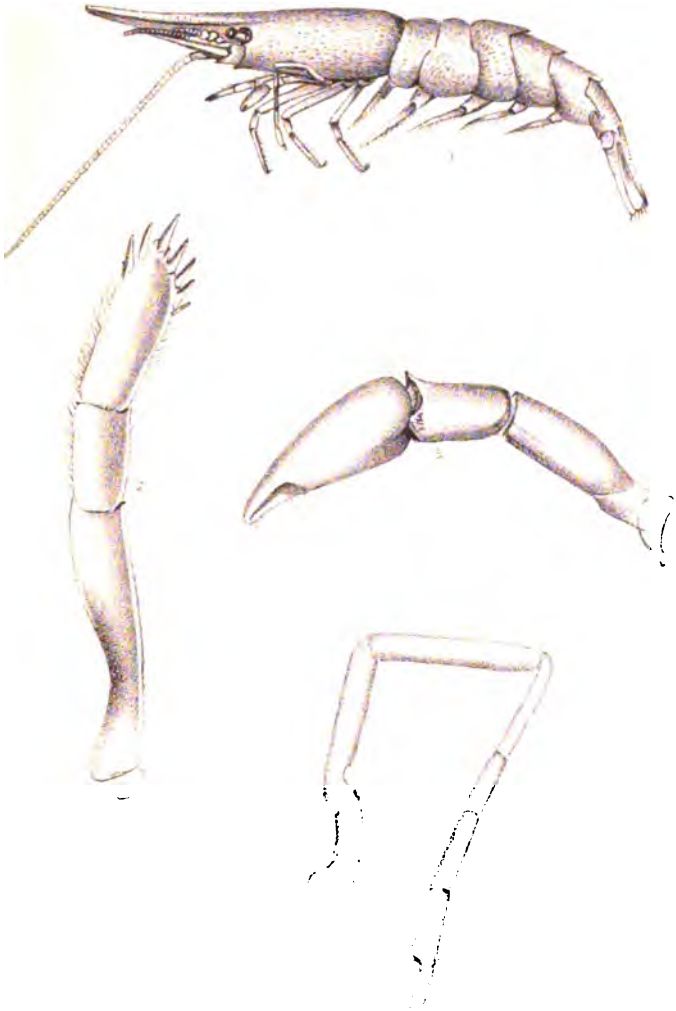

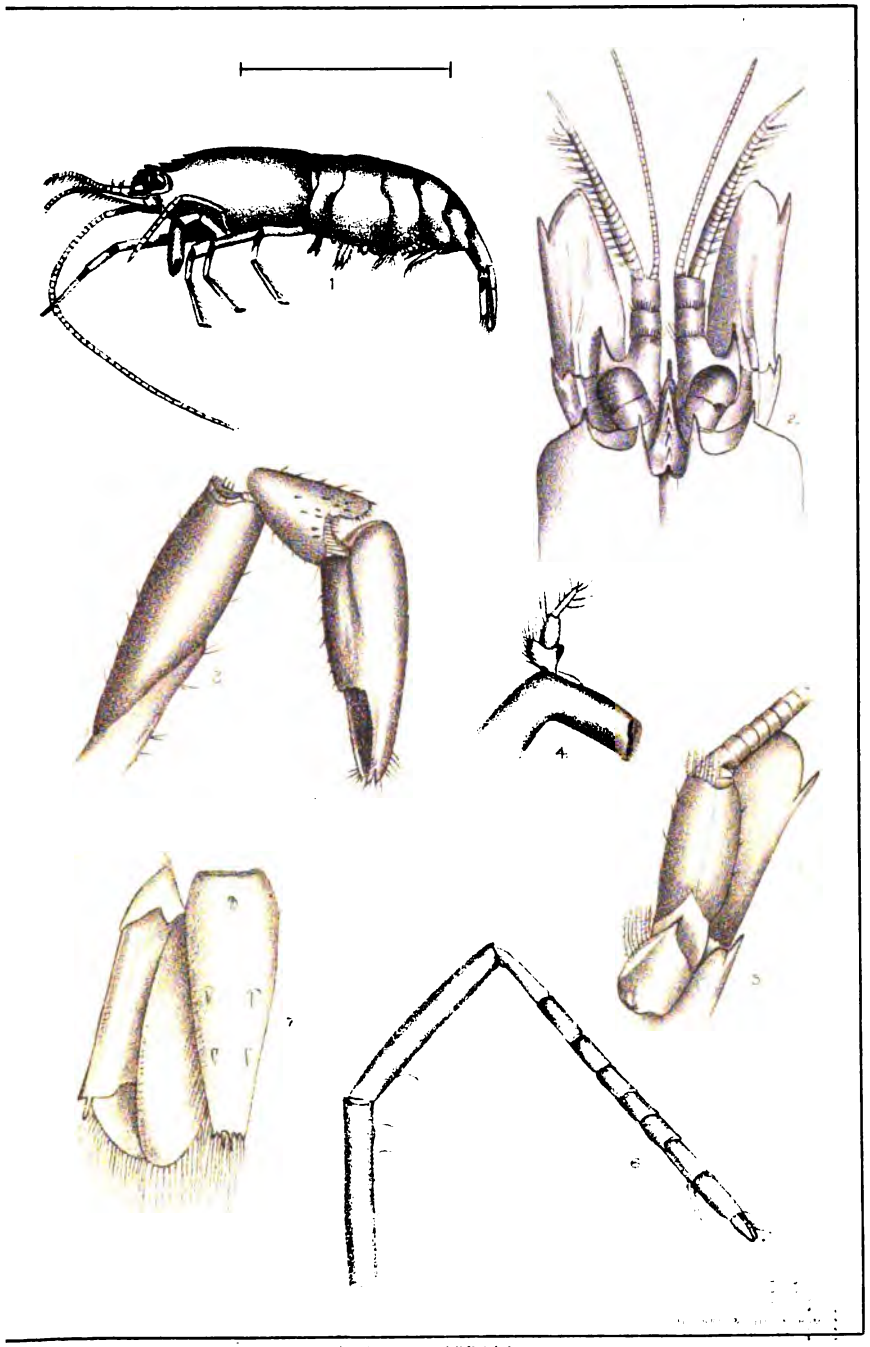

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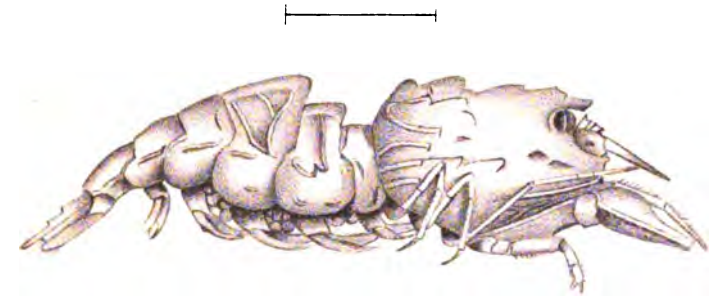

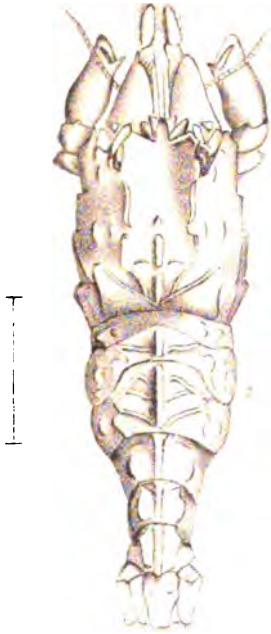

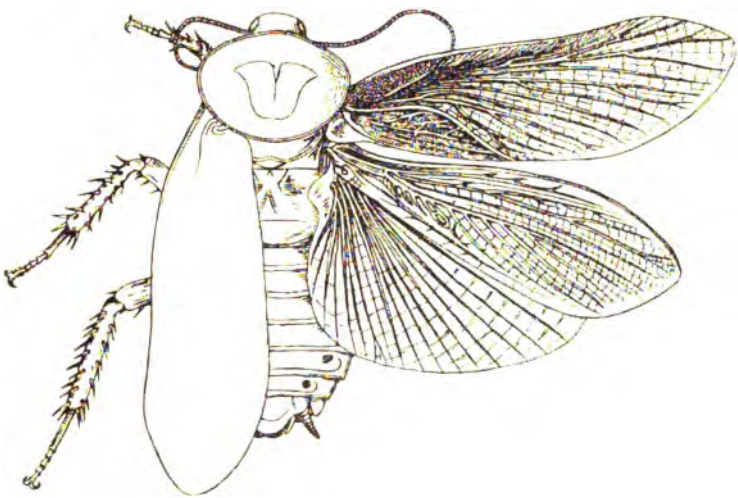

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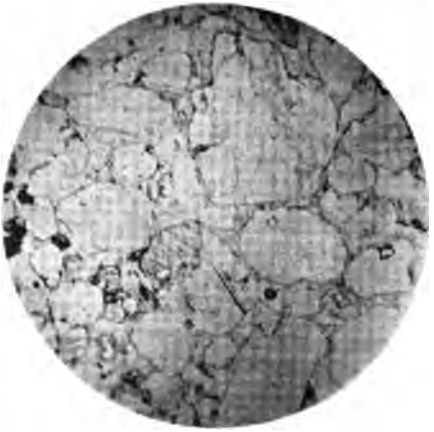

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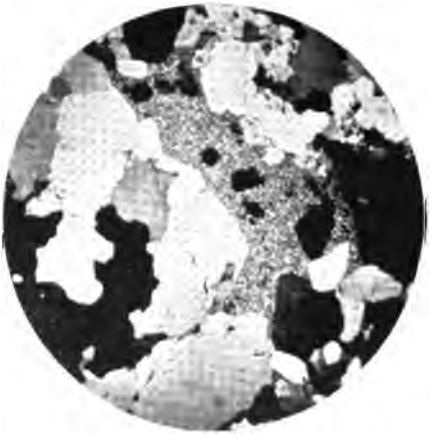

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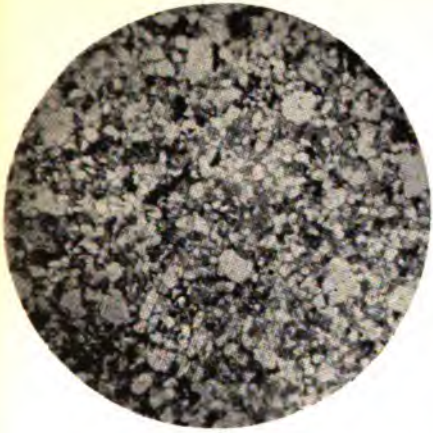

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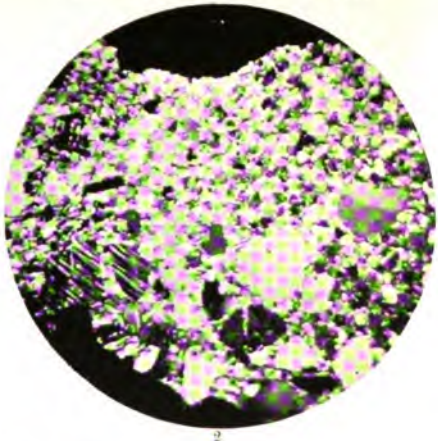

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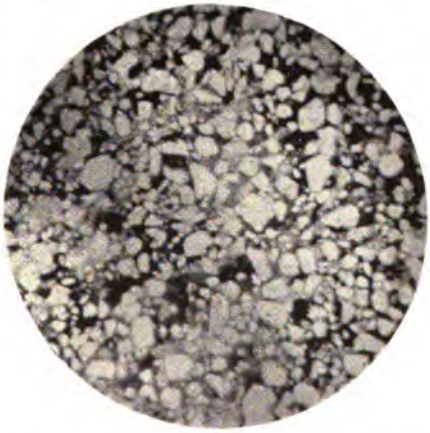

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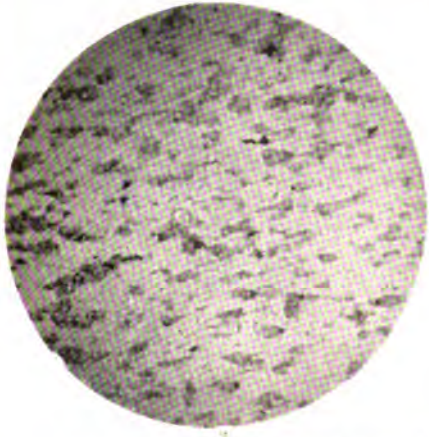

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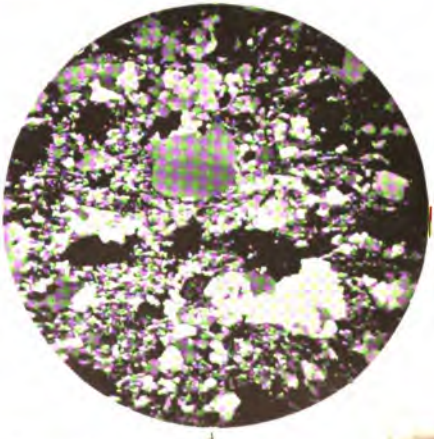

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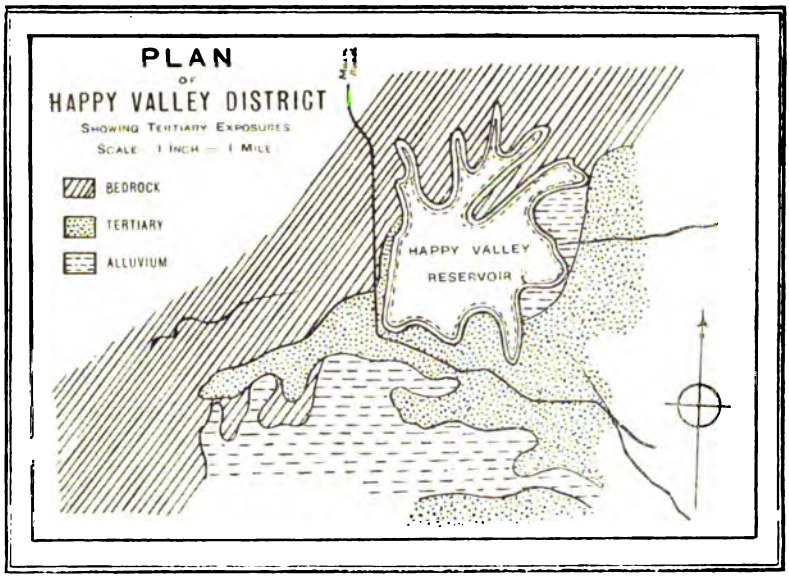
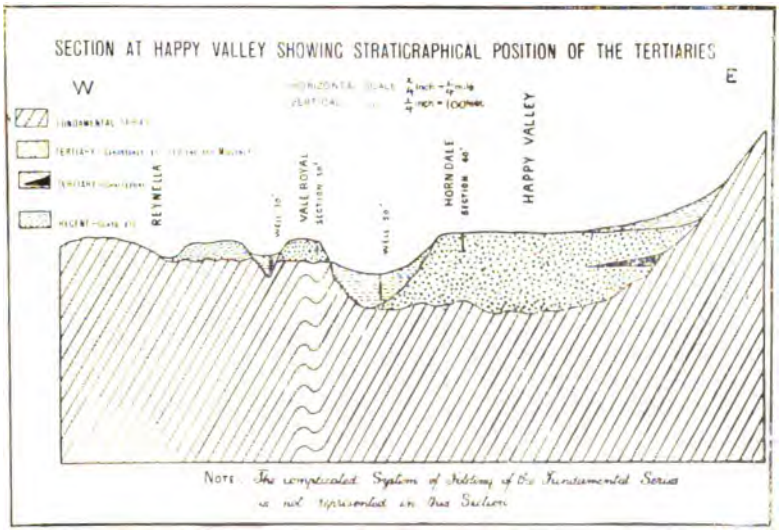

PLAN
OF
HAPPY VALLEY DISTRICT
SHOWING TERTIARY EXPOSURES
SCALE 1 INCH = 1 MILE
BEDROCK
TERTIARY
ALLUVIUM
HAPPY VALLEY
RESERVOIR


SECTION AT HAPPY VALLEY SHOWING STRATIGRAPHICAL POSITION OF THE TERTIARIES
W
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VALE ROYAL
HORNDALE
HAPPY VALLEY
NOTE. The complicated System of Folding of the Fundamental Series
is not represented in this Section

H. Basedow, Photo. EXPOSURE OF TERTIARY SANDSTONE, HAPPY VALLEY, S.A.

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W. E.

Photo. by Mr. J. Greenlees.]

GREAT ANTICLINE, FIELD RIVER.

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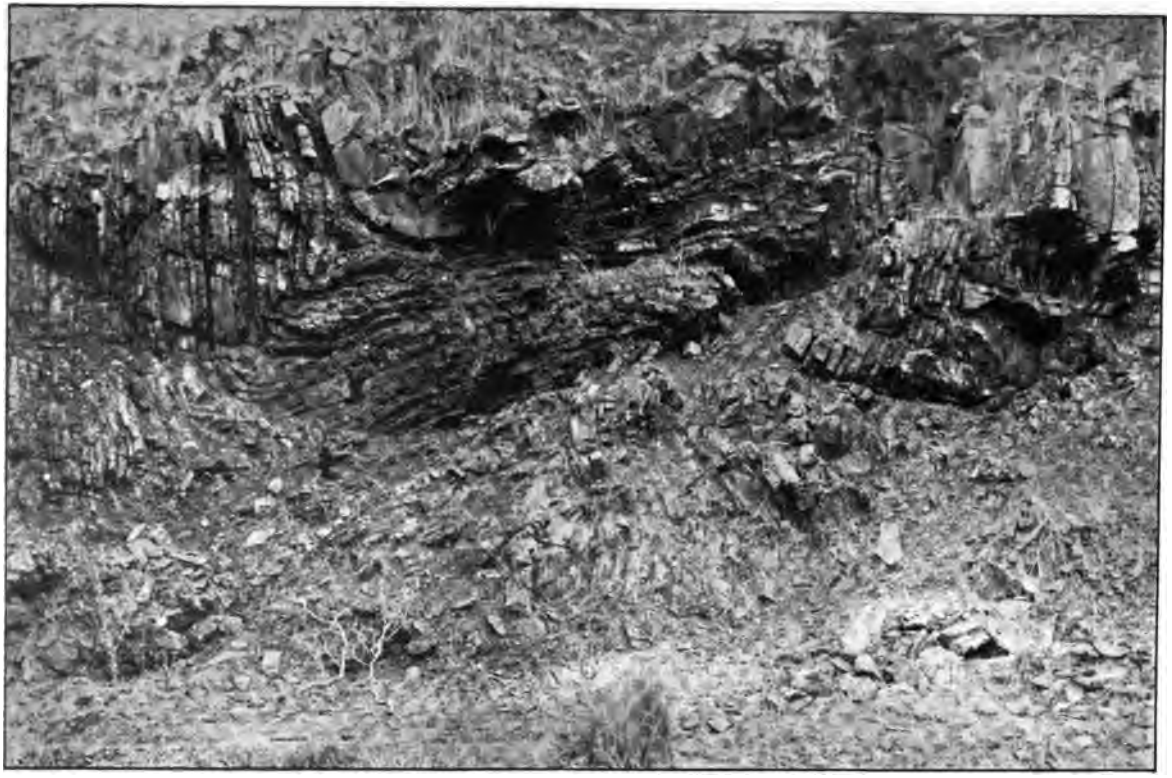

W.

Photo. by Mr. J Greenlees.]

OVERFOLD, FIELD RIVER.

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Photo. by Mr. J. Greenlees.] CONTORTED ROCKS, CURLEW POINT (North Side).

E. W.

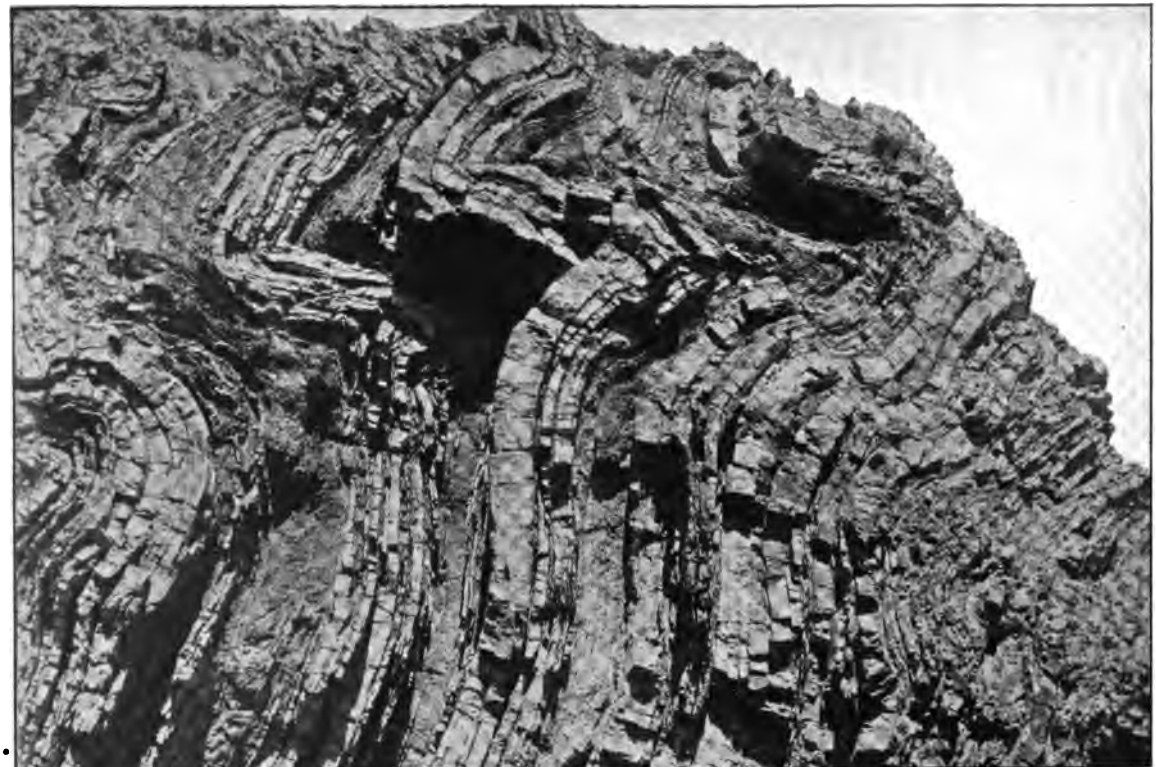


Photo. by Mr. J. Greenlees.]

CONTORTED ROCKS, CURLEW POINT (North Side).

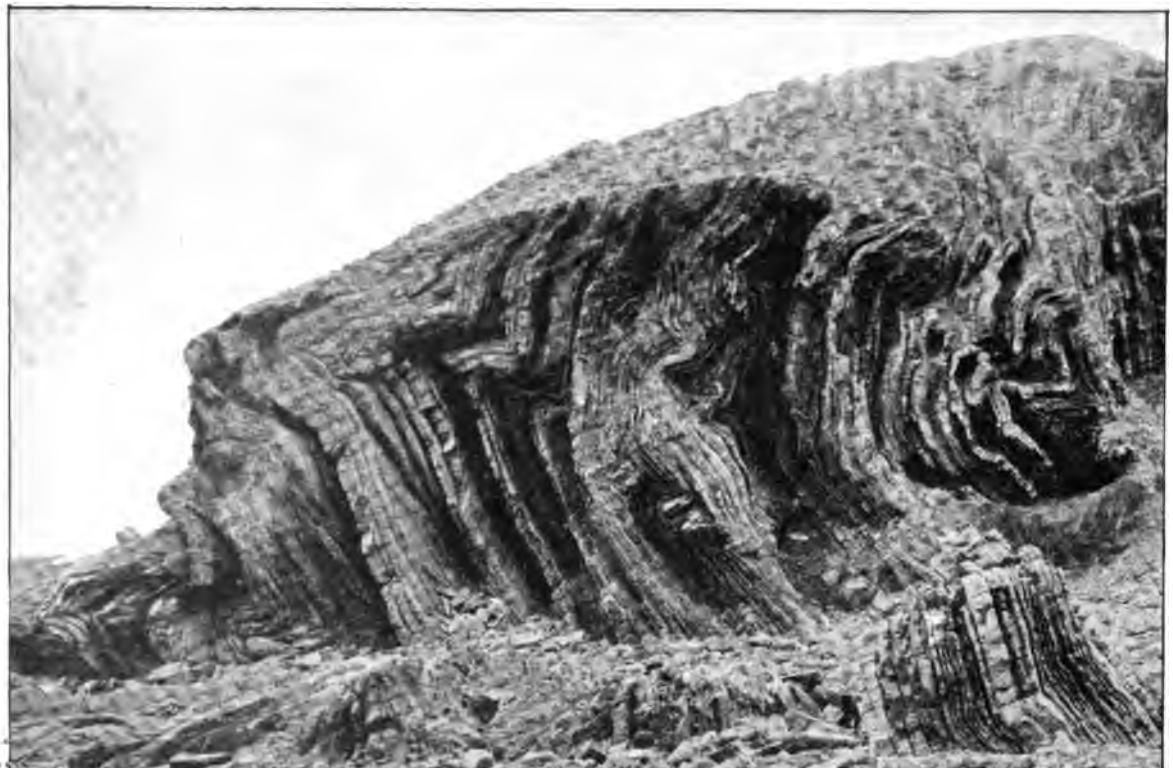
W.  E.

Photo. by Mr. J Greenlees.]

CONTORTED ROCKS, CURLEW POINT (South Side).

E.

W.

Photo. by Mr. J. Greenlees.]

CONTORTED ROCKS, ONE-EIGHTH MILE NORTH OF CURLEW POINT.

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H. Basedow, Photo.

EXPOSURE OF TERTIARY SANDSTONE, HAPPY VALLEY, S.A.

Hussey & Gillingham, Printers, Adelaide.

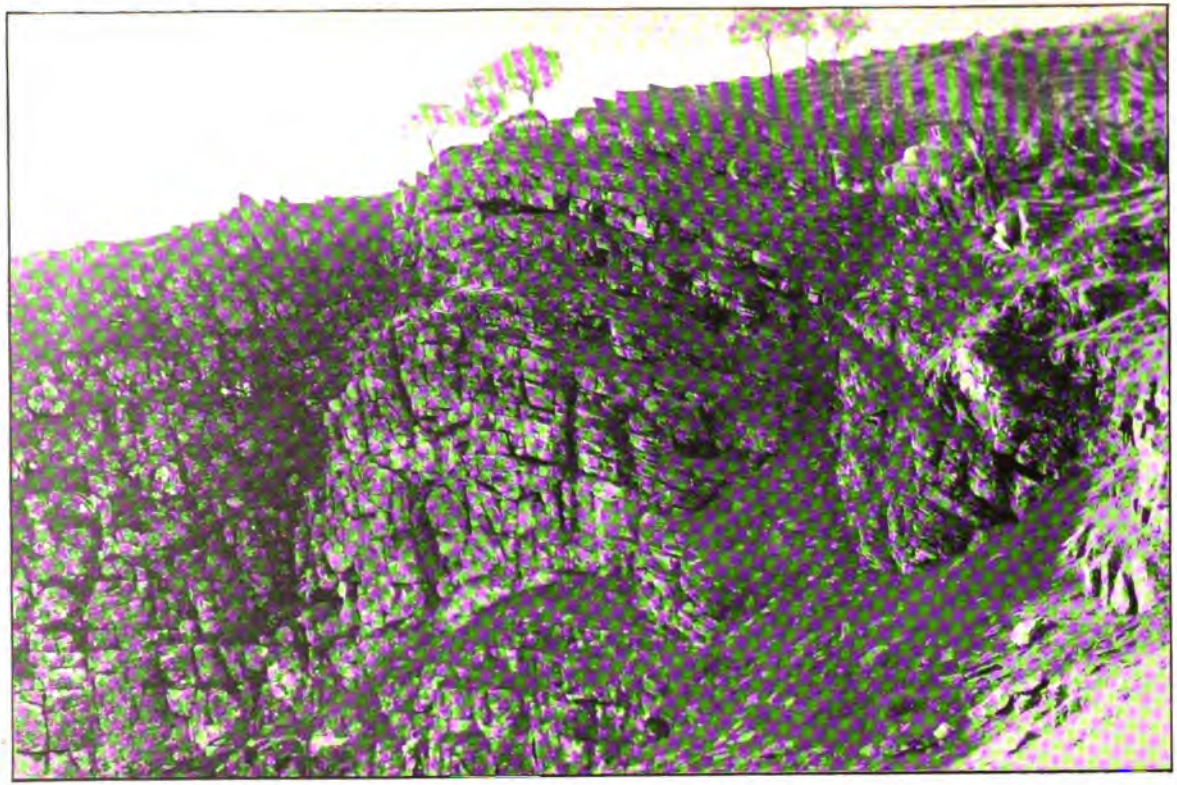
W.  E.

Photo. by Mr. J. Greenlees.]

GREAT ANTICLINE, FIELD RIVER.

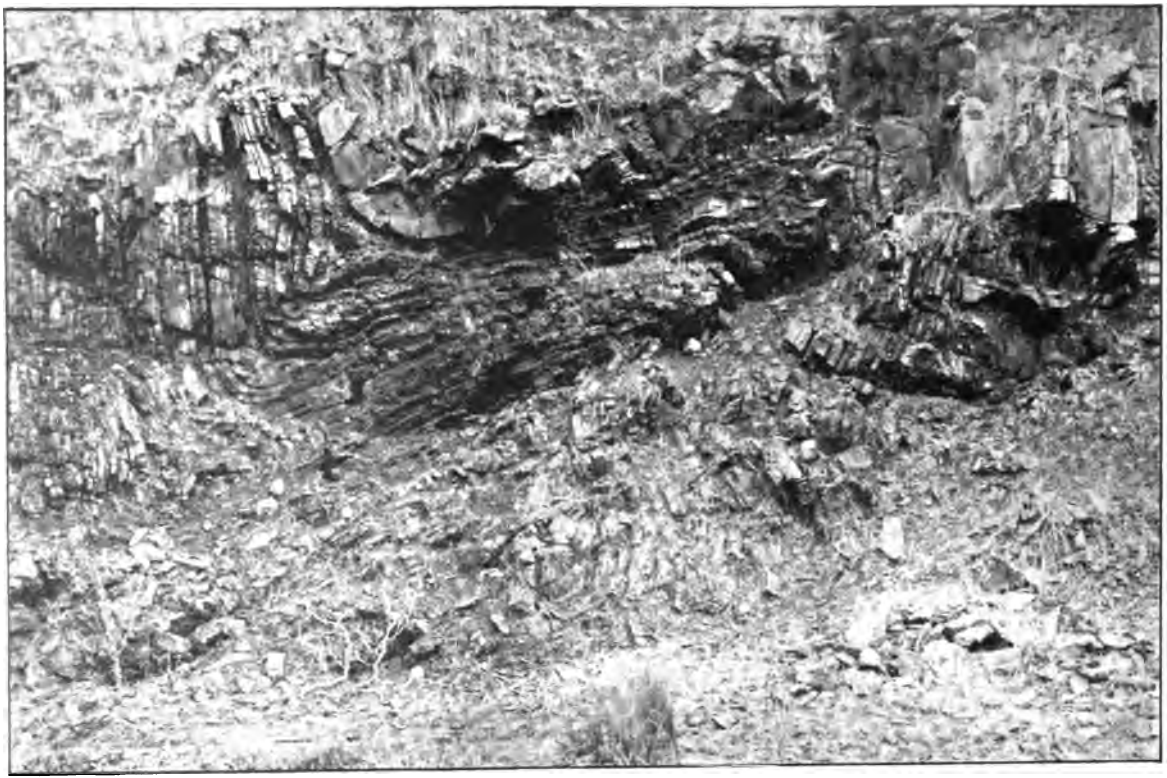
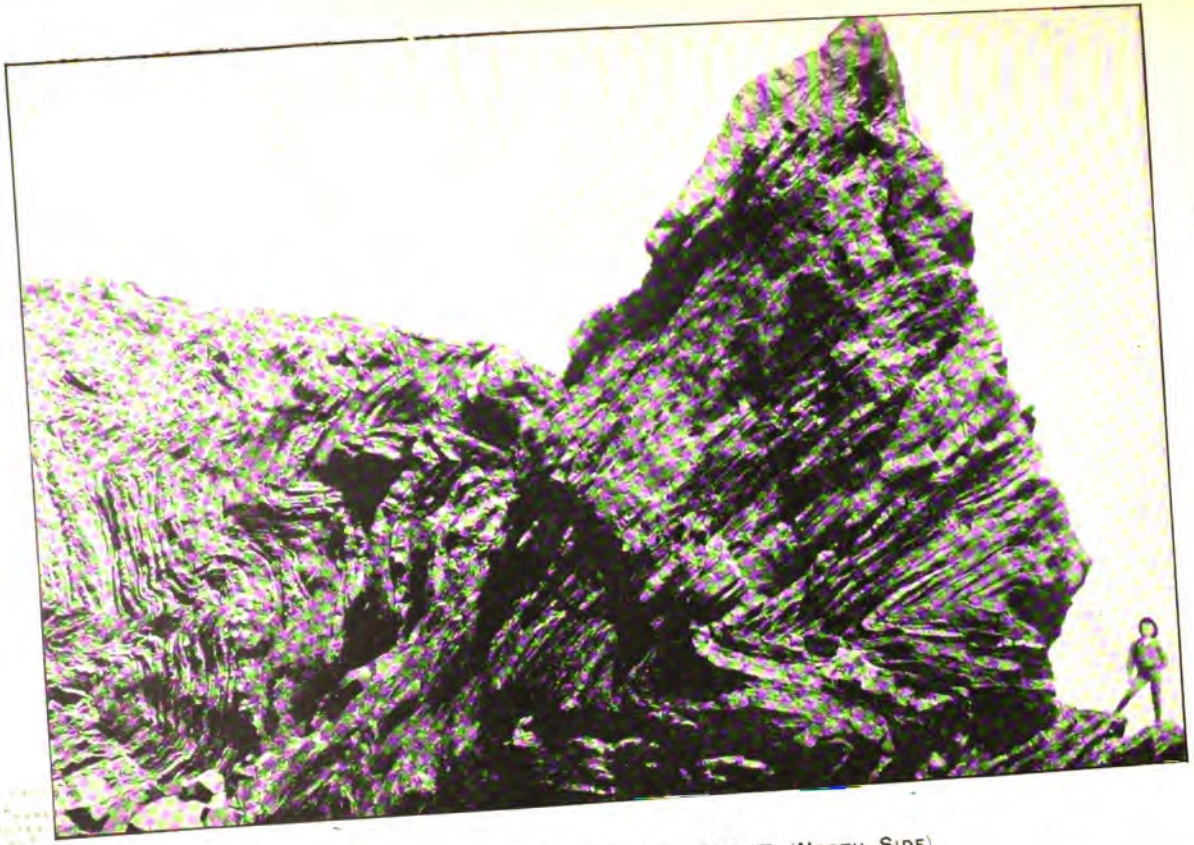
E.  W.

Photo. by Mr. J. Greenlees.

OVERFOLD, FIELD RIVER.

E.



W.

Photo. by Mr. J. Greenlees.] CONTORTED ROCKS, CURLEW POINT (North Side).

E. W.

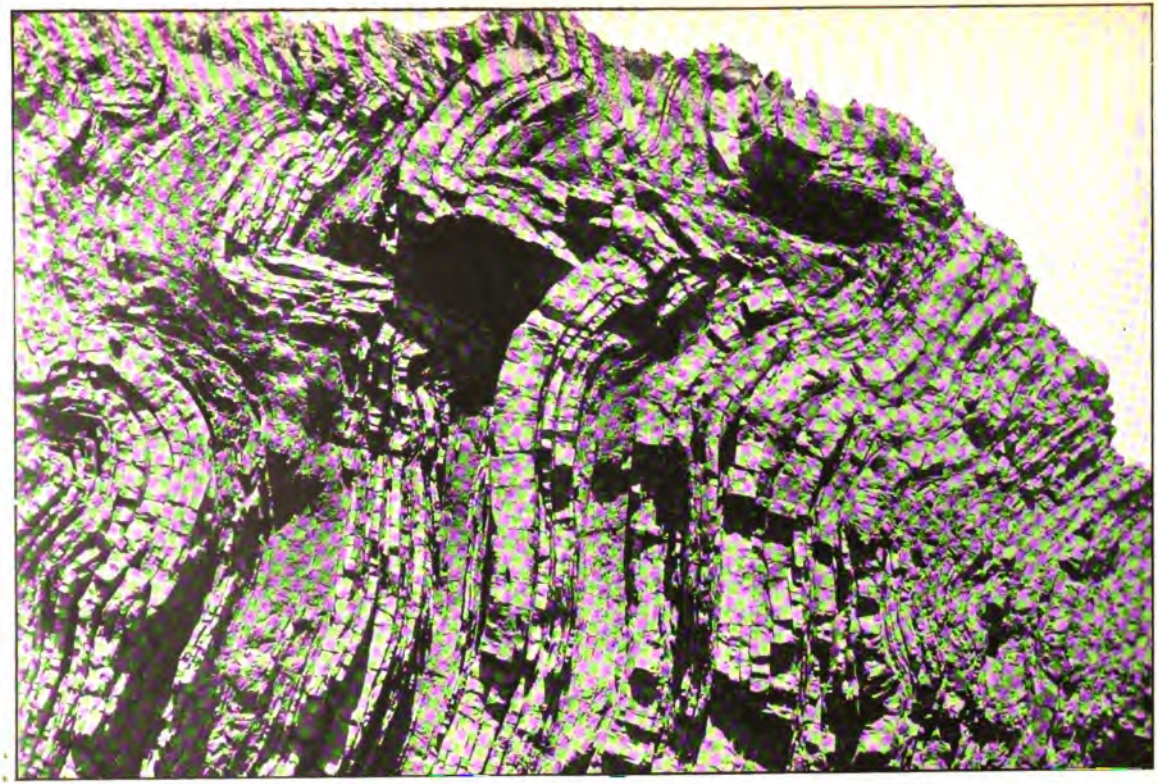


Photo. by Mr. J. Greenlees.]

CONTORTED ROCKS, CURLEW POINT (North Side).

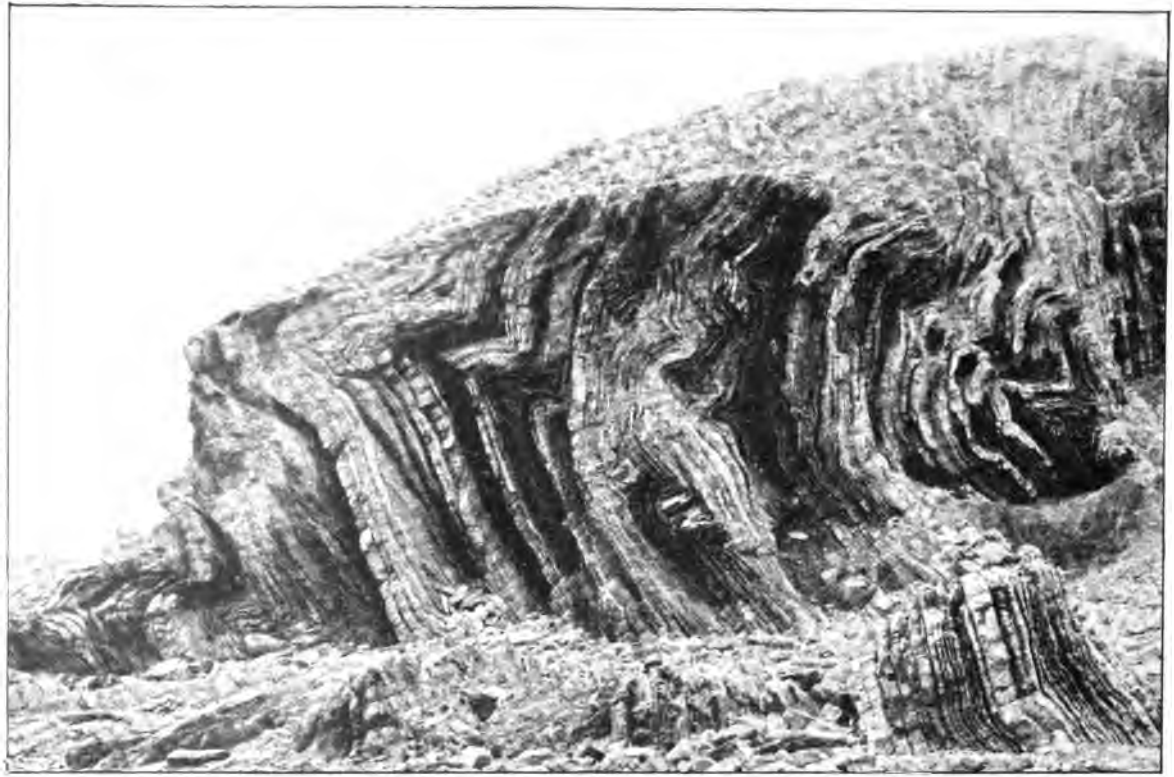
W.  E.

Photo. by Mr. J. Greenlees.

CONTORTED ROCKS, CURLEW POINT (South Side).

E.

W.

Photo. by Mr. J. Greenlees.

CONTORTED ROCKS, ONE-EIGHTH MILE NORTH OF CURLEW POINT.